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ABSTRACT

Selected articles on various aspects of biology teaching published in 1979 have been annotated in this two-part bibliography. Entries from 18 journals representing 11 different countries are presented according to a topic area classification scheme listed in the table of contents. Countries represented include: Australia; Bulgaria; Czechoslovakia; Federal Republic of Germany; France; German Democratic Republic; Great Britain; Hungary; Poland; Soviet Union; and the United States. The 16 general topic areas include: didactics of biology as a scientific discipline; history of biology; biology instruction abroad; teaching/educational objectives; gnoseological, psychological, and logical foundations of biology teaching; biology curriculum and content; didactical principles in biology teaching; methods used in biology teaching; organizational forms of biology instruction; planning; achievement; biology teachers; articles and information related to scientific biology; and articles on geology, mineralogy, and petrography. Each entry (numbered according to a code in the table of contents) includes author, original title (and English translation when appropriate), complete journal reference, and English abstract. Entries do not necessarily reflect all the topic and sub-topic areas included in the table of contents. (JN)

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INFORMATION BULLETIN

THE DIDACTICS OF BIOLOGY

A Selected Bibliography for 1979

PART I.

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Journals excerpted in this issue of the Bulletin

Australia

Nos. 1 - 4	Journal of Biological Education, 1979 - prepared by Dr.R. Anděrová, Zoological garden, Prague

Bulgaria

Nos. 1 - 6	Biologiya i khimiya, 22, 1969 - prepared by Dr. L. Rošická, Pedagogical Institute, Prague

Czechoslovakia

Nos. 1 - 10	Přírodní vědy ve škole, 30, 1979 - prepared by Dr. Věra Čížková, Faculty of Natural Sciences, Charles University, Prague
Nos. 1 - 10	Učební pomůcky ve škole a osvětě, 18, 1979 - prepared by Dr. Věra Čížková, Faculty of Natural Sciences, Charles University, Prague

Federal Republic of Germany

Nos. 1 - 8	Der mathematische und naturwissenschaftliche Unterricht, 32, 1979, prepared by Dr. A. Altmann, Pedagogical Faculty, Charles University, Prague
Nos. 1 - 12	Naturwissenschaften im Unterricht. Zeitschrift für die Unterrichtspraxis der Sekundarstufe I. Biologie, 27, 1979 - prepared by Dr. A. Altmann, Pedagogical Faculty, Charles University, Prague
Nos. 1 - 12	Praxis der Naturwissenschaften Biologie, 28, 1979, prepared by Dr. A. Altmann, Pedagogical Faculty, Charles University, Prague

Nos. 1 - 4	Der Biologieunterricht, 15, 1979 - prepared by Dr. A.Altmann, Pedagogical Faculty, Charles University, Prague

France

Nos. 1 - 4	Biologie Géologie, 66, 1979 - prepared by Dr. L.Rošická, Pedagogical Institute, Prague

German Democratic Republic

Nos. 1 - 12	Biologie in der Schule, 28, 1979, prepared by Dr.Horník, Faculty of Natural Science, Charles University, Prague

Great Britain

Nos. 1 - 6	Journal of Biological Education, 13, 1979 - prepared by Dr. R.Anděrová, Zoological garden, Prague
Nos. 1 - 4	Natural Sciences in Schools, 17, 1979 - prepared by Dr. R.Anděrová, Zoological garden, Prague

Hungary

Nos. 1 - 5	A biólogia tanítása, 17, 1979, prepared by the staff of the library at the Pedagogical Faculty in Nitra

Poland

Nos. 1 - 5	Biologia w szkole, 32, 1979, prepared by Dr. A.Altmann, Pedagogical Faculty, Charles University, Prague

Soviet Union

Nos. 1 - 6	Biologiya v shkole, 53, 1979 - prepared by Dr. F.Horník, Pedagogical Faculty, Charles University, Prague

USA

Nos. 1 - 10	The American Biology Teacher, 41, 1979 - prepared by Dr. R.Anděrová, Zoological garden, Prague
Nos. 1 - 10	The Science Teacher, 46, 1979, prepared by Dr. R.Anděrová, Zoological garden, Prague
Nos. 1 - 4	Science Education, 63, 1979, prepared by Dr. R.Anděrová, Zoological garden, Prague

1. Didactics of biology as a scientific discipline

ALTMANN, A.

Didaktika biologie jako vědecká disciplina - I.
(The didactics of biology as a scientific discipline - I)
Přírodní vědy ve škole, 30, 1978-79, No.1, pp.5-6

The author defines the didactics of biology; its subject matter can be divided into 13 sections: 1. the section containing the didactics of biology as a scientific discipline, 2. the section on the history of biology teaching and of the didactics of biology, 3. the section on contemporary biology teaching and the didactics of biology abroad, 4. the section on the educational and teaching aims and tasks of biology teaching, 5. the section on the teaching and educational process of biology teaching, including its gnoseological, psychological and logical foundations. The 6th section concerns the position of biology in curricula and the status of biology teaching in various types of schools. The 7th section concerns the content of biology teaching, the 8th the didactical principles used in biology teaching, the 9th the methods used in biology teaching, the 10th various aids and media used in biology teaching, the 11th various organizational forms of biology teaching, the 12th the planning of teaching lessons and the 13th problems concerning the biology teacher, his training and further self-education in biology.

vč

ALTMANN, A.
Didaktika biologie jako vědecká disciplina II
(The didactics of biology as a scientific discipline - II)
Přírodní vědy ve škole, 30, 1978-79, No. 2, pp.44-46

The article continues a discussion of the problems openned in a previous article, published in No. 1, 1978-79 of this journal. It concerns the division of the didactics of biology into a general didactics of biology and the didactics of biology specializations, such as the didactics of botany, of zoology, of human biology, etc. The author also points to the differences existing in the didactics of biology for various types and levels of school where biology is taught, for instance the didactics of elementary natural sciences, the didactics of biology in basic school, etc.

The article also discusses the status of the didactics of biology in the system of sciences and its relation to other sciences - to biology, psychology, pedagogics, Marxist philosophy and the didactics of other natural sciences. Finally scientific methods and the organization of scientific research in the didactics of biology are described.

VČ

2.3 History of biology teaching and the didactics of biology in other Socialist countries

DIETRICH, G. - HUMMER, G.
30 Jahre DDR - drei Jahrzehnte erfolgreiche Entwicklung des Biologieunterrichts (30 years of the GDR - three decades of successful developments in biology teaching)
Biologie in der Schule, 28, 1979, No.10, pp.401-421, 7 figs.

The authors divide the history of biology teaching into three stages: the first includes the years

1945-1949 when democratic transitions took place, the second is from 1949 till the sixties when a socialist school and the G.D.R. came into being, and the third stage began in 1963 and has been characterized by the development of a scientific didactical theory. The authors go on to discuss in detail each of these stages. In the course of the first stage it was necessary, among others, to overcome remnants of rasism, to develop new syllabi and make use of the progressive traditions available. The journal called "Mathematics and the Natural Sciences in the New School" began publication. Foremost representatives of this stage were A. Uhlig, A. Pietsch, A. Kupke and others. During the second stage, the concept of the didactics of biology closely linked to the life of society developed together with biology teaching.

This stage began with the IVth Pedagogical Congress, New syllabi were drawn up and new textbooks published, but the overloading of pupils and large quantities of learning by rote were not overcome. Darwinism and verbal methods still predominated. The material conditions for teaching gradually improved and the journal "Biologie in der Schule" began to be published. Soviet experience, as well as the work of domestic authors were made maximum use of and the first didactics of biology textbooks were published. During the last stage the methodology of the didactics of biology is being developed and new syllabi and curricula have been drawn up. Material conditions have continued to improve. A number of methodological publications have been written for individual textbooks.

FH

FELS, G.

Zu den neueren Lehrplänen der Bundesländer für die Klassen 5/6 im Fach Biologie (Concerning the newest syllabi used in the Federal lands for classes 5 and 6 in the teaching subject biology)

Biologieunterricht, 15, 1979, No. 1, pp. 61-71.

The author has subject to detailed criticism the newest syllabi for biology used in the 5th and 6th classes of secondary schools in the Federal Republic. His critique is aimed at four areas. The first is represented by the syllabi used in main schools (Hauptschule), technical secondary schools and general education secondary schools, the second area concerns the syllabi for all three types of schools, which differ only in the degree of difficulty, the third group concerns the syllabus for an a single type of school and the fourth, the syllabus used in the 5th and 6th class of integrated schools. The number of lessons devoted to biology in the 5th and 6th classes remains the same or is slightly increased, but in the upper classes, the number of hours devoted to biology decreases somewhat. The syllabi and curricula are analysed from three points of view: the formal (comparing a new syllabus with the old one, the number of species and systematic groups included, the extent of the monographical approach used in the syllabus, comparisons of morphology, the reduction of the number of species of plants and animals taught), from the point of view of the examples used and from the point of view of a specific standard selection of material. The majority of the syllabi begin with a brief course in cytology, together with microscopy; after zoology comes an integrated course in human biology, together with health-care education and sexual education, biology is based more on chemistry, there is more physics in the biology course (bio-physics), morphological topics are more combined with an explanation of functions, the ecological aspect is stressed in all parts of the syllabus and the amount of attention devoted to ethology has increased. The author also discusses the concept of various syllabi, the formal, cognitive and material aims they have, how much they go into detail, etc. The syllabus does not cite specific numbers of hours for individual topics and sometimes not even in what sequences various topics should be. It is up to the teacher to select basic material, its sequence of presentation and adequacy for individual age groups. Specific problem areas of the syllabi are cited.

AA

3.1 Contemporary biology teaching and the didactics of biology in the Socialist countries

ALTMANN, A.
Biologie s hygienou v polské desetileté střední škole
(Biology and hygiene in Polish ten-year secondary schools)
Přírodní vědy ve škole, 30, 1978-1979, No.4, p.131

Also in Poland general education secondary schools are being reformed. The newly drafted syllabi include biology and hygiene and are now being verified in a number of schools. It is interesting to note that the syllabus for this teaching-subject is concieved in a linear manner and integrates all areas of biology. The course is taught from the 4th to the 10th class, two hours per week, and in the tenth class, one hour a week.

The curriculum also includes elective courses in biology in the 6th to 10th classes for two hours weekly.

VČ

A biológia tanításanak reformjáról (On a reform of biology teaching)
A biológia tanítása, 17, 1978, No. 3, pp. 65-69.

An analysis of Party recommendations, which have been implemented since the taking of the 1972 decision to reform education. The article describes what has already been done, the tasks ahead and what should be done.

ANDRÁSSY, Peter
Az uj szakközépiskolai dokumentumokról (New regulations concerning secondary vocational schools)
A biológia tanítása, 17, 1978, No. 3, pp.72-76.

An analysis of the teaching subject biology from the point of view of various types of secondary schools.

BARNA, É. - SZABO, L.
A természettudomanyok összevonot oktatásának tapasztalatai 5. és 6. osztályban (Experiences with the concentrated teaching of the natural sciences in the 5th and 6th classes)
A biológia tanitasa, 17, 1978, No. 4, pp. 97-100.

The authors analyse the problem of concentrated teaching from the point of view of their own experiences and the contributions this type of teaching makes to the relationship between teachers and pupils.

CICHY, D.
Osiagniecia 35-lecia PRL w nauczaniu biologii (The results obtained in the Peoples Republic of Poland in 35 years of biology teaching)
Biologia w szkole, 32, 1979, No.4, pp.167-170, 3 tabs.

At the occasion of the 35th anniversary of the Peoples Republic of Poland, the author recommends stressing in biology lessons the social and economic development of the country on the basis of statistical data and graphs concerning hygiene, agricultural production and nutrition, nature conservation and natural resources, as well as public health care. Drawings can be used for this purpose. Information is available in the Statistical Yearbook or on the basis of data found there, other tables can be computed. Data on nature conservation in Poland is of great interest. For instance the number of protected animals living in Poland has developed in the following way:

	1960	1970	1975	1978
Bisons	145	341	466	505
Mountain goats	150	180	187	219
Bears	-	36	25	23
Beavers	217	540	801	950

AA

IVANOV, Y.Y.

Sovershenstvovat uchebno-vospitatelhiy process

(Improving the teaching and educational process)

Biologiya v shkole, 53, 1979, No. 1, pp. 3-6

The main task of general education schools is to gradually implement the resolution of the XXVth Congress of the Communist Party of the Soviet Union. The main ways of doing so in the area of the teaching and educational process, is to strengthen ideological and political education in teaching, the education of youth towards having a positive relation to work and also the linkage between biology as a teaching subject and practical agriculture. It is important to increase the efficiency of the teaching lesson. The article discusses in greater detail the problem of homework, the free use of various teaching aids and stressing the economics of their use. In the USSR the teaching of Russian to non-Russians as an international language is receiving greater attention. Also more attention should be devoted to the extra-curricula work of pupils in various hobby clubs. Very good conditions exist in the USSR for the implementation of all these tasks.

FH

KVASNIČKOVÁ, D.

Učební osnovy biologie základních a všeobecně vzdělávacích škol v některých socialistických státech

(Biology syllabi used in general education secondary and basic schools in some of the Socialist countries)

Přírodní vědy ve škole, 30, 1978/79, No. 2, pp. 43-44.

As a result of the rapid development of the biological sciences, the modernization of biology teaching has become a topic of interest throughout the world. The article provides information on the concept of biology teaching in basic and secondary schools in the USSR, the German Democratic Republic, Poland and Yugoslavia.

The guiding principle in the linear teaching of biology in the USSR is the scientific nature of biology - teaching thus procedes from the simple to the more complex. Relatively little stress is placed on general biological conclusions, which are important especially from the point of view of world outlook education and education towards environmental protection. Biology teaching begins in the 5th class and continues until the 10th class.

In the German Democratic Republic biology teaching also begins in the 5th class. The syllabus is divided into two cyclical sections, for the 5th to 10th class of basic school and for the 11th and 12th class of secondary school. The syllabus implements above all didactical aspects. Hence, the course begins not with the simplest organisms, but with those which are best known to the pupils. Stress is placed on utilizing all seasonal aspects in the course.

In Poland biology is taught from the 6th class, but in the 3rd to 5th classes there is a course called Learning about Nature. The scientific principle is foremost in the syllabus, which is divided into two parts, which are, however, not concieved in a cyclical manner, i.e. the repetition of a number of problems in both cycles (as in the G.D.R.). Basic school aims at teaching concrete knowledge which then serves as the foundation for more theoretical knowledge in general education secondary school.

In Yugoslavia the subject Learning about Nature is taught in the 4th to 6th classes and biology in the 7th and 8th class. The latter course is an integrated one and makes it possible to later teach highly demanding general biological concepts in the 1st to 4th class of general education secondary school.

VČ

NIKIFOROVA, I., TSVETKOV, T.
Po nakoy problemi na obučeniyeto po yestestvoznaniye
(Concerning some problems of natural science teaching)
Biologiya i khimiya, 22, 1979, No. 1, pp. 45-48.

All natural science disciplines which deal with the laws of nature form a single system of learning about nature, from the 1st to the 10th class. In the 4th class this includes a special course called Elements of the Environment, which continues the subject-matter of the civics course taught in the 1st to 3rd classes.

The first part of the natural science sourse deals with non-living nature (the planet Earth, its crust, water, the atmosphere), while the second part is devoted to living nature.

The important integrating fact that non-living nature forms the material foundation for the life of plants and animals is stressed.

The authors analyse the syllabus concerning various topics, from the point of view of various methods and psychological demands made upon pupils of the relevant age group.

In conclusion the authors stress that improving the pedagogical effectiveness of these topics will depend upon the organization of the teaching process, the individual work of the teacher and his skills in the use of the whole inventory of didactical media.

LR

PÓR, I

Az élövilág-tanitas 1977/1978. Évi feladatainak teljesítése Bacs-Kiskun megyében (How the tasks in biology teaching have been carried out in the Bács-Kiskun district)

A biológia tanítása, 17, 1978, No. 4, pp. 101-106.

A detailed analysis of how a reform of the educational system, which represents a top priority Party task, has been carried out in biology teaching.

3.2 Contemporary biology teaching and the didactics of biology in the foremost capitalist countries

DAUB, E.E.
Demythologizing White's Warfare of Science with Theology
The American Biology Teacher, 40, 1978, No. 9, pp. 553-556

The author discusses the increasing role played by creationism in biology teaching and criticises the book by A.D. White "The History of the Warfare of Science with Theology in the Cristian World" and especially two assumptions which are often assumed in connection with this book: that all the facts it contains are correct and that White's concept of warfare is a correct one. Some passages in the book are discussed from the point of view of their scientific precision. The myth of objective truth versus dogmatic theology is documented in White's work on the basis of his discussion of Aristarchos and the heliocentrical hypothesis. In conclusion the author states that in spite of the fact that biology teachers must overcome creationist opinions, it is not necessary to go so far as to teach the existance of war between the histories of science and theology, as White does. Rather than analyse White's mistakes and weak arguments, it would be better to acknowledge the final words of his book where he asks that science and religion continue hand in hand.

RA

Enseignement des sciences experimentales dans les classes de Quatriéme et de Troisiéme - sciences naturelles
(Teaching experimental sciences in the fourth and third classes - natural sciences)
Biologie, Géologie, 66, 1979, No.1, pp. 56-67

The Ministry of Education of the French Republic in November 1979 issued a circular letter with detailed instructions for teaching the natural sciences, especially geology, human biology, physiology and hygiene. The instructions are addressed to teachers in the third and fourth classes and also deal with methods which should be used. The full text of the instructions can serve as the basis for making comparisons of syllabi for teaching the natural sciences in France and elsewhere.

LR

MARINER, J.L.
Teaching Biology at the Secondary Level
The American Biology Teacher, 40, 1978, No. 3, pp. 148-149

The article provides a brief survey of the development of recent secondary school teaching. Certain changes have taken place in standardized teaching, especially in biology teaching. New discoveries have been included into the syllabus of high school. At present, however, a new aspect of biology is becoming important: its impact upon society as a whole. The author discusses the role of the biology teacher in the future, his training and education, and compares the education teachers receive today with the training they received 15 - 20 years ago, when it was sufficient to graduate from a teacher training college providing very little specialization. This older generation of teachers today has difficulties in teaching modern biological theory, including evolution, ecology and bio-chemistry. Teachers today should have the same scientific approach to biology as researchers have. In conclusion the author mentions some problems which biology teachers will have to cope with in the future.

RA

MAYER, V.J. - STOEVER, E.C., Jr.
NAGT Crustal Evolution Education Project: A Unique Model for Science Curriculum Materials Development and Evaluation
Science Education, 62, 1980, No. 2, pp. 173-179

The article acquaints the reader with a project developed by the National Association of Geology Teachers, called Crustal Evolution Education Project. First a brief history of the project is described and the concept of the model it is based on. Changes in teaching material are described. The main contribution of the project is the transmission of new findings of contemporary research on the Earth's crust and continental drift in school teaching. The project is being developed in six centers in the US and is centrally supervised. New material forms an appendix to existing syllabi concerning the Earth's crust. It is thus adapted to the needs of teachers in various levels of school.

RA

MONTGOMERY, L. - BENNETT, L.M.
MINNEMAST: Is It an Accaptable Instructional Mode for Kindergarten ?
Science Education, 62, 1978, No. 3, pp. 319-323
1 fig., 1 tab.

The authors acquaint the reader with the course and findings of a study aimed at evaluating the effectiveness of a standard educational unit called MINNEMAST in kindergartens, with the use of an experimental and control group of children. The experimental class received instruction from the program, while the control group did not. Before the findings are described, the authors discuss the existing literature on the subject. Before tests were given in the MINNEMAST program, which concerns mostly problems of symmetry, auxilliary studies were undertaken concerning other topics (for instance curves and shapes, descriptions and classification, making use of our senses and numeration). During the study itself the program was divided into three parts: symmetry based on rotation, the repetition of patterns and bilateral symmetry. The findings were statistically assessed and are summed up in a table.

RA

OGDEN, W.R. - JACKSON, J.L.

Secondary School Biology Teaching, 1918-1972: Objectives as Stated in Periodical Literature

Science Education, 62, 1978, No. 3, pp. 291-302.

4 tabs.

The article is a modification of a similar article published in 1975 which concentrated on chemistry teaching. In the present project its authors concentrated on biology. The aim of the study was to determine a chronological series of five selected topics found in biology teaching in secondary schools in the US during the years 1918-1972, as reflected in selected specialized periodic literature. The whole period was broken down into shorter periods on the basis of the social, political or educational history of the US. Thus a total of six periods was arrived at. Six specialized journals were also selected for the purpose. Criteria for selecting articles are cited, as well as a classification of approaches and analysis of data. The findings are summed up in tables and there is a detailed discussion of the findings in the concluding part of the article.

RA

SELIM, M.S.

Recent Developments in Arab Science Education.

Science Education, 62, 1978, No.1, pp.119-124.

In this article the author attempts to sum up the most important changes and trends which have occurred and patterns which have emerged in the area of developing natural science education in the Arab world. First the term Arab natural science education is defined. Then, a brief survey of the historical development of educational programs and systems before World War II and after it is provided. A description is provided of ALESCO (The Arab League Educational, Cultural and Scientific Organisation), which brings together all the Arab countries in this area of activity, and was founded in 1970. The author also cites the conditions which exist for education concerning the environment. In conclusion, the author stresses that the Arab educational system is in a state of development at the regional level, and thus provides many opportunities for research and development.

RA

SCHOFF, J.

Biologieunterricht in den Gesamtschulen der Bundesrepublik: Bestandsaufnahme und Tendenz (Biology teaching in all schools of the Federal Republic of Germany - situation and trends)

Der mathematische und naturwissenschaftliche Unterricht, 32, 1979, No. 7, pp. 402-406.

The development of biology syllabi in the middle of the seventies in the Federal Republic was very lively. These changes and developments can still be seen in the syllabi of various lands. The importance of textbooks in school teaching was confirmed; they can fulfil their purpose only if every three to five years revision are carried out on the basis of discussions concerning the syllabus. In teacher training there is an increasing influence of teacher unions and teacher associations. Various monographs on integrated topics have been published for the needs of teachers, but these in no way diminish the importance of up-to-date textbooks. The syllabus does not, however, take the interests of pupils sufficiently into consideration. The integrated teaching of biology, together with the other natural sciences, has so far not been accepted in the Federal Republic as an alternative method of teaching, which would stress inter-disciplinary relations. However, within the framework of the teaching subject biology, inter-disciplinary relations are stressed. The quality of teaching has improved and approximately one third of the course has an experimental form.

AA

TROMMER, G.
Darf Biologieunterricht gekürzt werden ? (Could biology teaching be shortened ?)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.4, pp. 124-125

At the end of 1978 the Society for Ecology (GfÖ) drew up and sent to all Ministries of Education in the Federal Republic of Germany a protest against the fact that biology courses are being shortened in school curricula. The reason for this is that biology is of great social significance. The author cites a number of arguments against shortening biology courses, which include new discoveries in biology, the nutritional problems of mankind, poisons found in milk and vegetables, new drugs and new health care problems, the stress which school children are exposed to, the destruction of surplus food, unsuitable architecture, etc. The author also makes the point that the modernization of teaching envolves more demanding and more time consuming methods of teaching (independent experiments and observations, work with original objects, etc.).

AA

VAN DER STEEN, J.C.
L'enseignement de la biologie aux Pays-Bas depuis 25 ans (25 years of biology teaching in the Netherlands)
Biologie, Géologie, 66, 1979, No. 3, pp. 399-406

Prof. Steen in this article discusses the development of biology teaching in the Netherlands, which in recent years has been extend by new subjects, which include bio-physics, bio-chemistry and bio-mathematics. He provides information on various types of secondary schools, the length of various courses and the progress of some experimental schools which have been in operation since 1963. He also describes in detail the biology curriculum, various syllabi which are used, the methods used in final examinations and practical training in biology. He expresses his disatisfaction with insufficiently qualified personnel in laboratories for the preparation of experiments and the use made of laboratory facilities and instruments, as well as with the financial resources allocated for these purposes and the quality of the existing textbooks which are not attractive enough from the point of view of the pupil. The author also discusses at length the qualification of teachers, their professional associations and the existing Committee for the Modernization of Biology Teaching.

LR

WARF, J.C.

Reflections on Science Education in the Pan-Malay World

Science Education 62, 1978, No. 2, pp. 257-262.

The article provides a survey of the development in natural science teaching in this region, which also includes the Indonesian Archipelago. In the introduction the author provides a historical survey of the whole region, its geographical position and makes brief comments on the ethnic situation. He then goes on to discuss the problems and development, as well as organization of basic, secondary and higher education and the role of natural science education. There are some comments on the development of the natural sciences in the developing countries in general. In conclusion the author cites in greater detail some alternatives and his own recommendations. The first concerns the right to independent decisions on the part of Asian nations, without the influence of Europeans or Americans. He also stresses the fact that an education in the natural sciences is a continuous process, which should be developed at all levels of education.

RA

36

ZÖLLER, W.

Probleme von Schülern in der neugestalteten gymnasialen Oberstufe (Sek. II) - oder: wie können wir sie gemeinsam herausfinden ? (The problems of pupils in the newly adjusted upper classes of the general education secondary schools: how should they be approached jointly ?)
Praxis der Naturwissenschaften-Biologie im Unterricht der Schulen, 28, 1979, No. 7, pp. 169-174)

The newly adjusted upper classes of general education secondary schools make it possible for pupils to chose some subjects on the basis of their propensities, talents and interests. Teaching takes place in classes, groups or mixed groups. This greater mobility of the pupil within the whole student body of the school might, however, have negative psychological effects on individual pupils. But mobility between various groups offers better opportunities for communication and cooperation, team work and more varied mutual interaction. However, pupils must first learn to work in groups. The author also provides information on a study carried out among pupils to determine how the pupils themselves assess the changes which have taken place, what they consider to be the positive and negative aspects of the new approach.

AA

4. The teaching and educational objectives and tasks of biology teaching

STREY, G.
Zum Problem des Bezugsrahmens didaktischer Entscheidungen (Concerning an approach to didactical measurement)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No. 5, pp. 139-144

The author discusses the problems of measuring values and the notion of educational and teaching norms for school. He points out that in the Federal Republic there is a group of educators who are still attempting to base the values of a contemporary industrial society on religion; on the other hand there exists a group of progressive educators who base their values on those of a Socialist society or on those of Marxism and their aim is a materialistic world outlook. The author points to the advantages of the Marxist didactics of biology and formulates the requirement that educational objectives be aimed at the relation towards basic knowledge of living and non-living nature and that contemporary society reject non-scientific Utopias. Both educational and teaching objectives should be reformed and should especially include education towards control of the environment and nature conservation.

AA

5.2 Specific features of biology teaching at general education schools

STŘIHAVKOVÁ, H.

K přípravě realizace nového pojetí výuky botaniky v 5. ročníku základní školy (On preparations towards the implementation of a new approach to botany teaching in the 5th class of basic school)

Přírodní vědy ve škole, 30, 1978/79, No. 8, pp.285-286.

A new textbook with illustrations in colour is being prepared for teaching in the 5th class; it has eliminated those terms which were found to be redundant or too difficult in view of the age of the pupils, as had been determined in the course of a verification program for the text. The principle of ostensiveness is thoroughly implemented throughout the textbook, so that every term which is explained in the text is accompanied by functional illustrations.

Uniform methodological instructions have been prepared for the use of teachers. Another aid available to teachers is a manual called Practical Excercises in Botany, which contains various suggestions for work activities, observations and experiments with plants. Another manual is being prepared, called Questions for Motivation, Excercise and Acquisition of Knowledge. Also new pictures, models, cassette films and other aids are being prepared.

VČ

5.71 Natural science teaching

KVASNIČKOVÁ, D.
Přírodověda do našich škol (The natural sciences in our schools)
Přírodní vědy ve škole, 30, 1978/79, No.1, pp.3-5

The structure of natural science teaching in our schools begins in the 3rd class of basic school in a teaching subject called Natural Science. This subject provides an integrated course with elements of physics, chemistry, geology, biology and partially also astronomy. It thus provides a foundation, on the basis of which individual natural sciences can than be taught in the upper classes of basic school. Great stress is placed on the educational impact of the course, especially the forming of a scientific world outlook in children and forming a correct attitude towards nature.

In the course of the 3rd class, the course includes elements of physics, chemistry, geology and biology. In the 4th class the course continues with the same topics which are developed on a broader scale, so that formal mental operations are used to a greater extent, as well as confrontations with the pupils´ own experiences.

The basic requirement of the new approach in teaching the natural sciences is a teaching method where the pupils work more or less independently, under the supervision of a teacher.

VČ

5.8 The teaching and educational significance of the teaching of individual biology disciplines; mutual relationships between individual biology disciplines; determining the order of individual disciplines in teaching biology.

HOMOLA, J., PUMPR, V.
Přírodovědné vzdělání v období vědeckotechnické revoluce (Natural science education in the period of the scientific and technological revolution)
Přírodní vědy ve škole, 30, 1978/79, No.4, pp.122-123

One of the important problems which in the period of the scientific and technological revolution should be dealt with in the area of the natural and also the technical sciences, is the relation between a scientific and didactical system. From a quantitative point of view, the scientific system is much more extensive than a didactical system. However, in view of its purpose and function, the didactical system extends beyond the scientific system in the relevant area of cognition on the basis of its formal, pedagogical purpose. Thus it cannot be formed only on the basis of a mere reduction of a scientific system, since its final aim differs and it therefore uses different methods and instruments.

Another problem, which should be dealt with, is the decreasing speed of the still increasing divergence between a scientific and a didactical system. This problem can be approached at two levels: 1. the reorganisation of educational instritutions, while at the same time increasing their numbers and 2. a re-structuring of the educational process form the point of view of its content.

The content of teaching changes above all in dependence upon the development of society and its needs. At present, stress is placed above all upon the mental aspects of work,while the demands made upon technical understanding, as well as upon abstract thinking and learning methods for the acquisition of new knowledge and extending existing knowledge,are increasing. From the educational point of view, such traits as responsibility, independence, creativity, personal iniciative, etc. are becoming increasingly important.

VČ

SCRIVER, C.R. et al.
The Education of Citizens: Human Genetics
The American Biology Teacher, 40, 1978, No. 5,
pp.280-284, 1 fig., 2 tabs., lit. 6

The article brings the findings of a research project concerning high school students. It concerned their knowledge of human genetics and biology. The article also describes methods for using biology textbooks in these two areas. First the methods used in the research project are described. Included in the project were textbooks, their table of contents, index and bibliography. The students were administered questionnairs. The findings of both parts were assessed together, and summed up into tables. Questions concerning the interests of students lead to the finding that students were especially interested in evolution theory, genetics and human biology. In the concluding recommendations, the authors acquaint the reader with three main areas for increasing motivation for learing genetics: greater use of textbooks, improving the knowledge and information with teachers have and the extended use of audio-visual aids.

RA

5.9.1 Biology teaching at institutions of higher learning

DEAN, D.S.
College Biology Teaching
The American Biology Teacher, 40, 1978, No.3, pp.150-151.

In this article the author considers suitable jobs and careers for biology majors from colleges. Earlier it was natural for the teacher to train students for intermediate level jobs of the type they themselves were doing. Such a situation cannot, however, continue to be maintained. The article provides information for those who really want to study education at an institution of higher learning and acquaints them with various types of these schools and the education required of teachers at present. Also the problem of training college teachers of biology is discussed. In conclusion the author considers the opportunities open to those who do not find a job in the field they have specialized in.

kA

RUTSCHKE, E. - BRĂTZ, U.
Spezialkurs "Verhaltenswissen" der PH "Karl Liebknecht" Potsdam (A special course in ethology at the Karl Liebknecht Teacher Training School in Potsdam)
Biologie in der Schule, 28, 1979, No. 2-3, pp.119-122. 2 figs.

The program for the further education of teachers includes, besides mandatory courses with a definite content, also special courses whose organization and content depends upon the institution of higher learning. These special courses make it possible to go into greater detail in some subjects. One of the disciplines in which teachers tend to have gaps in their knowledge in ethology. The author describes the ethology course (its lectures, seminars, observations and experiments). The basis of the course is formed by an introduction to ethology methods used in studies in a natural environment. Besides this the students also study the learning process, biorhythms and biocommunication in the laboratory.

FH

MURRAY, D.L.

A Visual Recall Probe of Cognitive Structure

Science Education, 62, 1978, No.1, pp.39-46, 6 tabs.

The aim of this article is to acquaint the reader with the findings of a study of the scope of visual recall in cognitive structures. A visual recall probe is described, developed by Haber, and the relation of this test to other tests is discussed. The author tested the hypothesis that the validity of recall will decline with the subsequent measurement of performance. Finally, the author considers the use of a visual recall probe for the early detection of differences in learning. In the introduction to the article, the author acquaints the reader with some literary findings and then with the structure of the whole study - its topic, conditions, the essence of visual recall, performance tests and statistical analysis. The findings are summed up in a table and are discussed in detail.

RA

SMIRNOV, I.N.
Filosofskoye naslediye V.I. Lenina i metodologicheskiye problemi sovremennoy biologii (The philosophical heritage of V.I.Lenin and the methodological problems of contemporary biology)
Biologiya v shkole, 53, 1979, No.2, pp.6-11.

One of the problems which philosophy should deal with, is the constant improvement of the methods used by scientific and theoretical thinking. The effective solution of methodological problems of science always requires a study of the history and development of human cognition, including the philosophical heritage of outstanding thinkers, especially V.I.Lenin. V.I.Lenin considered the development of science to be very important. He was interested in problems connected with the forming of notions and theories - an analysis of these processes is given in his book "Materialism and Empiriocriticism". He elevated dialectical materialism to a higher level, extended and made more precise the content of its categories and strengthened the link between dialectical materialism and science, as well as social practice. In his work "On the Significance of Militant Materialism" he stressed the necessity of linking the natural sciences and philosophy. The methods used by exact science are now penetrating contemporary biology. Biology is important for the forming of a scientific world outlook. The theoretical foundation of a historical approach in biology has been formed by Darwin's theory of evolution. The Leninist concept of development is of great importance for the further development of contemporary evolutionary biology and this is analysed in detail by the author. Biology should at present overcome empirical approaches on the basis of theoretical concepts and generalizations within the framework of what is called theoretical biology.

FH

6.1 The Forming of Biological Concepts

AVERINA, L.M. - KALINOVA, G.S. - KOMISSAROV, B.D.
Formirovaniye ekologicheskikh i evolutsionnikh ponyatii u shkolnikov VI. klassa (The forming of notions in ecology and evolutionary biology in 6th class pupils)
Biologiya v shkole, 53, 1979, No. 4, pp. 46-49.

The syllabus and the textbook for biology include information on ecology and evolutionary biology only in their two final topics - "The Development of Plants on Earth" and "Plant Communities". In order to find earlier occasions for introducing certain concepts and notions into teaching, a pedagogical experiment was carried out in five schools in the period 1974-1978, the outcome of which is described in this article. It was found that the biology syllabus in the 5th class provides the opportunity for teaching pupils elementary data on the evolution of the species and that ecological notions and terms should be introduced in the 6th class. In explaining the term biocenosis, a model was used in the form of an aquarium, where the pupils were able to observe food chains. The knowledge thus obtained was then made more specific with the aid of another model - this time of a space ship. During autumn excursions the pupils observed what they had previously learnt in school. In the course of the experiment, the authors attempted to show the pupils the multivaried forms of links existing between plants - as an example they chose meadow clover. In the topic "Angiosperms and their Classification" other ecological and evolutionary terms were introduced.

FH

BRUNOVT, E.P.

Metodika na razvitiye na znaniyata po biologiya

(The methodology of developing biological knowledge)

Biologiya i khimiya, 22, 1979, No. 5, pp.17-22, 1 tab.

The author analyses various levels of cognitive activities of pupils during learning which include:

1. the factual and informative
2. the factual and explenatory
3. operational and proof providing
4. operational and cognitive
5. creative congnition.

Specific activities and practical excercises are adequate to various levels of cognitive processes. The author sums them up in the form of a simple table called "Typical Tasks for Pupils in Learning Biological Knowledge".

LR

TSUZMER, A.M.

Rozvitiye ponyatiya ob obmene veshchestv v shkolnikh kursakh botaniki i zoologii (Developing the notion of metabolism in the botany and zoology courses)

Biologiya v shkole, 53, 1979, No.5, pp.46-51.

Developing the notion of metabolism has not been quite solved. Pupils first become acquainted with this notion in the 5th class in the topic "The Cell" and then when studying the structure of seeds, especially in connection with the notion of energy. The notion of metabolism becomes apparent in the topic "the Leaf" and is developed in relation to the environment. This notion is then developed in the topic "The Stem" and "The Plant as an Integrated Organism". In the 6th class it is developed in relation to basic groups of plants. In zoology there are a number of opportunities for developing this concept, from the study of protozoa, up to the study of mammals, thus forming the foundation for teaching the physiology of man in the 8th class. The author cites specific examples and the formulation of various questions, as well as general conclusions on this subject.

FH

KOSTOVA, Z.
Analiz na biologichnite ponatiye u peti klas i tkhnota usvoyovaniyot uchenitsite (An analysis of biological concepts in the 5th class and their learning by pupils)
Biologiya i khimiya, 22, 1979, No.5, pp.34-39.
2 tabs.

The transition to the new concept of biology teaching requires finding solutions to the main problem of how to systematize and structure biological concepts, how to implement their mutual relations and place within the syllabus, so that pupils are able learn them.

It is first necessary for the teacher himself to be understand these problems. Table no. 1 helps in this. It includes a classification of biological concepts used in the 5th class and divides them into general and special ones, those which belong into cognitive categories or polytechnical categories.

Another table divided botanical notions and concepts into general and subordinated ones.

Diagrams nos. 1 and 2 outline the structure of the syllabus. Diagram no. 1 concerns the structure of the plant cell so that the relation between its structure, function and the environment become clear.

Diagram No. 2 is of a similar nature and concerns the subject of plant stems.

LR

TABACKI, A.
Wprowadzenie pojęcia jednostek systematicznych
(Introducing the notion of systematic units)
Biologia w szkole, 32, 1979, No. 1, pp.37-39, 1 tab.

In the second class of general education secondary schools attention is paid to the problems of the system classification of plants and animals and the foundation for understanding systematic concepts are laid. The author cites the experience of educators in the G.D.R. (Müller 1975) and Polish educators (Tabacki, 1977) who in pedagogical journals have devoted attention to the problem of forming biological concepts and systematics in the course of teaching. In this work, use is made of literary sources, such as keys for the determination of flora and fauna, which usually, however, do not include all the representative genra of flora and fauna included in the syllabus, but only domestic ones. The author therefore suggests the use of various tables for the forming of systematic units, and their special characteristics - for instance among vertebrates the covering of bodies, body colour, the structure of dactyls, skin, the colour of the abdominal side (in amphibians). In the table one family is developed in greater detail, into genera and specie.

An advantage of these tables is that they make it possible to form basic systematic concepts and to make diacritic signs more precise. Illustrations and pictures found in atlases can also be used in working with the table. The author provides a key for the determination of Polish and foreign amphibians, which includes 16 species.

AA

ULYSSE, J.

Evolution des notions et des concepts de la 6^e à la 5^e à propos de la respiration (The development of notions and concepts on respiration from the 5th to the 6th classes)

Biologie, Géologie, 66, 1979, No. 3, pp.437-439

A group of biology teachers has drawn up an outline for teaching the physiological phenomenon of respiration. It cites all general aspects of the respiration of vertebrates and invertebrates, respiration at the level of the whole organism and respiration as a general phenomenon pertaining to the whole living world. The author concludes that the outline can be used for teaching various representatives of fauna.

LR

6.4 Acquainting pupils with basic scientific methods used in biology and with the school equipment and aids used in biology teaching

FRITSCH, H.

Zu einigen Fragen und Problemen bei der Durchsetzung von Schülertätigkeiten (Concerning some questions and problems in organizing pupil activities)

Biologie in der Schule, 28, 1979, No.9, pp.380-382.

The teachers in the school where the author also teaches have made up a catalogue of activities which enumerates the type of activity each of them should be capable of carrying out. Since 1974 pupils also have their catalogues, which describe how problems are dealt with, how definitions, comparions and conclusions are made. One of the problems is that some activities have not been precisely defined, for instance mental activities, practical activities, etc. The author cites several concrete examples of observations, explanations and assessments. Precise definitions and practical examples of their use in teaching are provided for all activities described.

FH

6.5 Developing skills and habits

ANNIS, L. - DAVIS, J.K.

Study Techniques - Comparing Their Effectiveness

The American Biology Teacher, 40, 1978, No.2, pp.108-110. Lit. 12.

The article describes four research projects which dealt with the problem of how students take notes during class and in the course of various study projects. On the basis of the relevant literature, the authors claim two important functions for the taking of notes: they capture what has been heard in class and they are an aid in the repetition of what has been learnt before an examination. The first project showed that the taking of notes is very important for later recall. Practical conclusions are made which follow from this finding. The second project concerned the problem of which study technique is the most effective, the mere reading of a text, underlining in a printed text and making one's own notes. The final two projects attempted to determine the relationship of these techniques to the period of repetition before an examination and the suitability of three types of tests - multiple choice tests, brief answers and the writting of an essay. In conclusion the authors cite some opportunities for making use of their findings in teaching.

RA

BASANKINA, Z.V.
Iz opita organizatsii truda uchashchikhsya (An experiment concerning pupils' organization of work) Biologiya v shkole, 53, 1979, No. 4, pp.34-40, 2 tabs.

The scientific organization of work in the context of school requires an increase in the effectiveness of lessons and greater rationality in the pupils' homework. The author then concentrates on examples in which the rational organization of pupils' activities has been achieved. The basic principles of such organization are summed up in nine points, which have been placed on the bulletin board in the biology classroom (these include such points as how to work with textbooks, how to analyse a classmate's anwser, etc.). The most important aspect of improving pupils' learning activities is to make them understand the aims and reasons for their own school activities, while the second most important aspect is the course of the lesson and the summing up of findings. The third most important aspect is an anticipation of the pupils' future activities. The author also cites a number of observations from her own experiences - for instance having pupils assess the answers provided by their classmates. Various problems connected with this type of activity are described on the basis of the teaching of the topic "Fertilization of the Soil and Plant Nutrition". The making up of various tables represents a form of effective class work. Also pupils' notes are discussed and the forming of habits concerning the taking down of notes in class are discussed.

FH

DORAN, R.L.
Measuring the "Processes of Science" Objectives
Science Education. 62, 1978, No.1, pp.19-30

The article deals with various measurement techniques concerning student skills in learning "Processes of Science". First a historical introduction is provided concerning the development of this new teaching subject. The author then discusses Bressler's four elements of "scientific thinking", Burnester and other authors. He discusses in greater detail the learning of this subject by students at various levels of schoool. Various types of tests are described including the SAPA program (Science - A Process Approach) which has a short-term and long-term alternative, the ERIE Science Process Test and modifications of the SAPA program. High schools use mostly a POST (Process of Science Test) which contains 40 questions with multiple choice answers. The author also mentions another type of test, called Scientific Observation and Comparison Test. In conclusion these tests are mutually compared and their use and importance discussed.

RA

POPE, J.
What About the Honors Student ?
The American Biology Teacher, 40, 1978, No.2, pp.105-107.
2 figs.

"Honors students" are those who have achieved marks above 80% in standard tests in high school. Often they receive opportunities to develop their abilities. In this article the author suggests special teaching for these students in the form of individual tutorials. He provides more detailed information on the course "Marine Biology and Fresh Water Biology" for these excellent students. At first general knowledge and various skills are taught, including aquatic biology, the chemistry of an aquatic environment, the biology of the cell, the use of microscopes. Special topics include marine and fresh water flora and fauna, the ecology and physiological properties of an aquatic environment. In conclusion the students write essays in the form of scientific papers. After completion of the course, the student prepares for an examination. First 10 questions are discussed, which concern what has been taught in the course, then the results are assessed quantitatively. When a student achieves at least 90% correct answers he advances to the next course. In conclusion the author cites some problems connected with this system.

RA

6.6 Application of acquired knowledge, skills and habits in practical life

BERASHEVICH, I.W. - ISURINA, R.I.
Rasshireniye znaniy uchashchikhsya o narodnokhozyastvennom znacheniyi rasteniy (Extending pupils' knowledge of the importance of plants for the national economy)
Biologiya v shkole, 53, 1979, No. 6, pp. 56-59

In teaching botany, much attention is paid to the practical use of various plants and their significance for the national economy - and the authors document this on the basis of specific examples. They also have recommendations for work in hobby clubs. Such a hobby club in the city of Vitebsk included in its plan of activities becoming acquainted with the utilization of plants on a largerscale than assumed by the biology syllabus. The hobby club has 20 pupils from the 5th and 6th classes, who meet three times a month. The pupils become acquainted with local flora and organise excursions to local plants. They also carry out practical excercises with plants (for instance the extraction of pigments, obtaining fibres, the extraction of essential oils and turpentine).

FH

6.6.1 The combination of biology teaching and socially useful work

WARD, C.R. - HERRON, J.D.
Science Course Enrollment Figures: Do We Have Them ?
Science Education, 62, 1978, No. 3, pp.325-331. 4 tabs.

The article acquaints the reader with two research projects which dealt with science course enrollments. One project was carried out by the Educational Research Information Center and the other by the National Center for Education Statistics. The authors compare both projects and concentrate especially on their similarities and differences and discuss some contradictory aspects. Both projects used the same method for obtaining their samples from public high schools, but they differed in the number of students covered, in the questionnairs used and their distribution. Also the concept of the questionnairs differed. Individual comparisons are summed up in tables. RA

6.7 Guidance of pupils towards successful learning in biology. Activization of the pupils

BOWYER, J. - CHEN, B. - THIER, H.D.
A Free-Choice Environment: Learning without Instruction
Science Education, 62, 1978, No. 1, pp.95-107, 4 figs, 5 tabs.

The article describes the learning of students in an environment which makes them self-sufficient to a maximum degree. Studies have determined that the students of modern schools are able to control variables and to understand the essence of scientific and every-day media or phenomena. Findings have indicated that free-choice conditions are a suitable supplement to normal teaching based on a curriculum. Examples of this type of teaching are provided and methods used for its assessment are described. The findings are summed up in tables which are accompanied by detailed discussions. Statistical assessments have been carried out by X^2 tests and U-tests.

RA

FRANKE, I.

Jede Möglichkeit zur geistigen Aktivierung der Schüller nutzen (Every opportunity should be used to activate pupils)

Biologie in der Schule, 28, 1979, No. 1, pp.4-6

The article is a paper presented by the author to the VIIIth Pedagogical Congress. In the educational and teaching process, use should be made of every opportunity to increase the mental activity of pupils. The cognitive process should be supervised in a continuous and thorough manner. Various practical activities, such as mounting specimens, preparing microscopical specimens and observing them under a microscope are very popular activities. Long periods of observation, learning definitions and explaining various phenomena are less popular activities, which require a high degree of mental concentration. On the basis of the example of various tasks formulated for the purpose of a biology and geography excursion, the author demonstrates how she went about activating her pupils by formulating hypotheses, carrying out analyses and syntheses and drawing conclusions. The tasks concerned the relations between the structure and function of an organism and its environment.

FH

KÁRPÁTI, L.

Középiskolai tehetségkutató biológiaverseny Nyugat-Dunántúlon (The seeking of children talented in biology in secondary schools in the Western Trans-Danube Region)

A biologia tanítasa, 17, 1978, No. 4, pp. 125-127.

The author describes the organization and age structure of participants in a biology competition and also provides an analysis of the results achieved.

REINHARTZ, J.

To Know Why: Systematic Science Curriculum Through Learning Centers

Science Education, 62, 1978, No.2, pp.153-164, 1 fig.

Natural science teachers often encounter the problems of how to increase the interest of students in their subject and in school and classes in general. The author of the article cites a model curriculum, which might at least partially help to solve this problem. The model is based on a curriculum which centers on the student. Science is used as a means of achieving skills in asking questions, in thinking, in narration, listening and in writing. The author cites key skills, aims and key concepts. Also the questions for a test which is intended only for verification and not for obtaining marks are provided, as well as notes for a teacher on one topic, cited as an example (controlling the environment). Some learning centers are cited - for activities, for the reading of specialized literature, for carrying out specific projects, for publications. The article includes bibliographies, sources, instructions for teachers and the formulation of aims.

RA

Für eine höhere Qualität der pedagogischen Arbeit
(Striving for a higher quality of pedagogical work)
Biologie in der Schule, 28, 1979, No. 1, pp.1-3

The article is a summary of a paper presented by the Minister of Education of the German Democratic Republic, M. Honecker, at the VIIIth Pedagogical Congress. She spoke of the optimistic climate which prevails in dealing with educational problems in the G.D.R., the unique position of the teacher and the necessity of concentrating on basic education. Many groups of educators stress the need for the activation of pupils and work with individual pupils.

FH

TANKOV, B.A.
O nekotorikh priyomakh aktivizatsii poznavatelnoy deyatelnosti uchashchikhsya (Concerning some methods of activating the cognitive activities of pupils)
Biologiya v shkole, 53, 1979, No. 6, pp. 41-44

Teaching procedures aim at supervising the cognitive activities of pupils. In order to arouse the interest of pupils in what is being taught, various methods can be used and the author deals with their classification. Among the methods which can arouse pupils' interest in learning cited by the author are novelty (pupils prefere to learn something new, unusual, unknown, etc.), the forming of problem situations, the usefulness of a topic (for example pupils prefere learning about edible mushrooms, rather than about molds), its dynamic nature (demonstrations with teaching media) and the semantization of a topic (asking questions). Among the methods which make learning easier are heuristic methods (asking broader questions and combining them with simpler questions which lead to simple answers), the use of Socratic methods (discussions with pupils) and experimental approaches (where pupils formulate conclusions on the basis of observations, experiments and the study of literature). Finally the author cites methods for reproducing what has been learnt.

FH

6.7.1 Analysis of the reasons why pupils fail in biology and methods of eliminating these reasons

LACOMBE, G.
La mémoire (Memory)
Biologie, Géologie, 66, 1979, No. 3, pp. 433-436

The article deals with the problem posed by those pupils who claim they "have a poor memory". In the first part of the article the author describes her experiences in class, where first the pupils look at drawings on the blackboard and copy them into their notebooks. The teacher makes corrections and explains various problems. The pupils look and listen. After this concrete stage, the pupils are divided into four groups and they are asked to repeat what they had seen and heard. In the second part of the lesson, which takes place the next day, the teacher examines the perception of the pupils as far as what they had seen and heard is concerned or what they had written down in their own hand. This methodological procedure can be supplemented, extended or changed, according to need.

LR

6.7.2 Education towards logical thinking in biology teaching, teaching models

HENNIG, W.

Arbeit mit Orientierungshilfen für geistige Tätigkeiten (Working with orientation aids to mental activities)

Biologie in der Schule, 28, No. 7/8, pp. 320-322

The article is a reaction to an article published in issue No. 1 of this journal in 1979, concerning basic knowledge on the course of mental activities as a prerequisite for the development of abilities. The author expresses her agreement with the conclusions made by the article, but moreover is of the opinion that pupils need various aids to support their memories, that in the course of teaching more tasks should be given together with fewer questions and that large reserves exist in this area. In order to help her pupils, the author gave them various written orientation aids for important mental activities, for instance a clarification of the essence of comparisons, definitions, descriptions, explanations, etc. Experiences with the use of these aids have been very good.

FH

KLUS, W.

Sichere Grundkenntnisse über den Verlauf geistiger Tätigkeiten als wichtige Voraussetzung zur Entwicklung von Fähigkeiten (Reliable basic knowledge on the course of mental activities as an important prerequisite for the development of abilities)

Biologie in der Schule, 28, 1979, No. 1, pp. 14-18. 1 tab.

In spite of the fact that one of the demands made by the syllabus is to develop abilities in pupils, the methodology of achieving this end has not been the subject of sufficient attention. A necessary prerequisite is a knowledge of the inner logic of mental activities. The author cites various ways of excercising mental activities, such as making descriptions, clarifications, definitions, comparisons, reasoning, assessment. Also taking notes on various biological phenomena is important. An outline of such notes should include a formulation of the problem, the planning and execution of an experiment, its observation and an assessment of its outcome and findings. In developing abilities, large reserves exist in a uniform approach used by all teachers in a school - in other words in the coordinated teaching of biology together with other subjects.

FH

SEHMRAU, W.

Wissenschaftliche Denk- und Arbeitsweisen - Grundlage der Entwicklung sozialistischer Persönlichkeiten
(Scientific method of thinking and work procedures - the foundation of the development of a socialist personality)
Biologie in der Schule, 28, 1979, No. 5, pp. 192-201.

The author stresses the polytechnical aspect of forming abilities in biology teaching, i.e. the importance of forming abilities for preparing pupils for work and social activities. The forming of abilities is based on a knowledge of procedures and their active application, and is decisive for the independent learning of new skills and for the rapid and objective acquisition of new knowledge. In biology teaching this concerns on the one hand professional skills (such as for instance using a microscope) and general natural science skills (which are needed in all the natural sciences - for instance the application of experimental methods). The author deals in greater detail with the problem of the verification of experiments and stresses the correct writing up of reports according to an outline. He then goes on to discuss the principles upon which the development of abilities is founded (general principles, principles for the gathering of material for pupils, the principles of work with a handbook).

FH

6.7.5 Logical procedures in biology teaching

PRIVAULT, D.
Induction et Empirisme (Induction and empirism)
Biologie, Géologie, 66, 1979, No. 3, pp. 449-452

The article is a polemic against the opinions of some of the author's collegues, as far as the induction and empirical methods are concerned. The author discusses these terms in the context of the great thinkers who used them, such as Francis Bacon, Karl Popper, Gaston Bachelard, Claude Bernard, Darwin, Louis Pasteur and Louis Althausser. In conclusion, the author explains his own point of view on this subject.

LR

6.8.1 Forming a scientific world outlook in biology teaching

BLUMBERG, B.

"Abstammungslehre und Schule" in der Weimarer Republik ("Evolutionary theory and school" in the period of the Weimar Republic)
Biologie in der Schule, 28, 1979, No. 1, pp.23-27.

The author first analyses typical trends in the teaching of biology in the period under consideration. Since 1925 the syllabus included, besides logical proof of evolution, also new proof (for instance from physiology). But in basic school a non-scientific, theological approach predominated in biology teaching and evolutionary theory was not even included in the syllabus. The causes of this were pedocentrical pedagogy, the movement called "work school" and also the German version of the "monkey trail" held with the teacher Weber.

FH

BLUMBERG, B.

Der Missbrauch des biologischen Unterrichts durch den Faschismus (The abuse of biology teaching in the period of Fascism)
Biologie in der Schule, 28, 1979, No. 7/8, pp. 298-302

This article completes a serie concerning the history of biology teaching in the period 1865-1945. The author first describes the pseudo-scientific theories which served Fascist ideology, such as social Darwinism, racisms and also chauvinism, anti-Semitism and anti-Communism. Fascist teaching was evident in the German language, history and biology courses. Topics which were used for this purpose included especially theories on the forming of insect communities, relations towards the bio-cenosis and the use of human genetics. The article descusses also other aspects of the Fascist influence on biology teaching and the fact that some biology educators succumbed to Nazi ideology. All this led to the low quality of biology teaching until 1945. After 1945 the main task of educational policy was to rid the schools of Fascist ideology.

FH

ALEXANDER, R.D.
Evolution, Creation and Biology Teaching
The American Biology Teacher, 40, 1978, No. 2, pp. 91-96, 101-104, 107. lit. 53.

In some areas of the USA the influence of creationist theories in the course of biology teaching has increased. The author cites the example of two states - Tennessee and California. Some teachers who themselves studied at a time when the ideas of natural selection and evolution where not yet common-place, have difficulties in finding arguments for the modern concept of biology teaching. This article is addressed to such teachers. After an introduction, the author cites some general comments on evolution and especially the work done by Charles Darwin and some of the problems which biology teachers should know about in this context. Five elements of modern evolution theory are dealt with in detail - heredity, mutation, selection, genetic drift and isolation. The article also discusses some of the arguments put forth by modern creationist theory, describes its dichotomies and errors in its description of natural selection.

RA

Dalneysheye uluchsheniye politichesko-vospitatelnoy raboti - vazhnaya zadacha shkoli (The further improvement of political and educational work - an important task of schools)

Biologiya v shkole, 53, 1979, No. 4, pp. 3-5.

In the coming school year a number of events will take place which will be reflected and will determine the course of the school year. Attention is devoted to the forming of the pupils' personality in the spirit of Communist morality. The resolution of the Central Committee of the Communist Party of the Soviet Union "On the Further Improvement of Ideological, Political and Educational Work" stresses the importance of Communist education. The journal Biologiya v shkole also participates in this endeavour, as is evident from a number of articles published on this subject, which are cited in the present article.

FH

GALYAMOVA, A.A.

Ispolozovaniye krayevedecheskogo materiala v tselyakh ideyno-politicheskogo i ekonomicheskogo vospitaniya uchashchikhsya (The use of regional elements in the ideological, political and economic education of pupils)

Biologiya v shkole, 53, 1979, No. 6, pp. 22-25

In educating pupils it is important to acquaint them with scientific and technological progress and the penetration of the successes of science and technology into the national economy, as well as with the prerequisites for improving the efficiency and quality of production. A number of opportunities for this are provided in the biology course, and in this context a regional approach to the problem can prove to be fruitful. Such an approach leads to the activation of pupils and the development of their interests and concrete knowledge. The utilization of regional elements is documented by the author on the example of the topic "Variability and Heredity" in the general biology course, as well as the topics "The Organism", "The Environment", "Photosynthesis" and "The Selection of Plants, Animals and Microorganisms".

FH

IVANOV, Y.Y.

Luchshe uchit, luchshe vorspitivat (Better teching, better education)

Biologiya a shkole, 53, 1979, No. 5, pp. 4-6

To the existing tasks of school within the educational and teaching process another has been added - the further strengthening of the ideological and political aspects of the teaching and education of the young generation. In teaching the natural sciences this task is fulfilled on the basis of specific examples concerning the development of the economy and nature conservation. The implementation of this task assumes the study of various sources, as well as preparing specific examples concerning local workers and plants. This task is also implemented among pupils in the course of working on experimental plots of land and in school work brigades, which lead young people to seek the causes of biological phenomena, to link biology to practical life and being able to select essential information on a given topic; it also has a role to play in vocational guidance.

The basic form of the teaching and educational process is the teaching lesson. Its efficiency should be increased by the more rational utilization of the time available. This assumes the use of new methodologies which concentrate on independent study of pupils of available material. Various examples from the biology course are cited. Natural science hobby clubs, extra-curricula activities and pupils' work associations can all serve to extend biological knowledge. The teacher's most important task is the forming of a Communist world outlook in children.

FK

LENK, K.
Möglichkeiten zur philosophisch-weltanschaulichen Bildung und Erziehung (Opportunities for world outlook and philosophical teaching and education)
Biologie in der Schule, 28, 1979, No. 6, pp. 303-307.

The author discusses the topic "Selected World Outlook and Philosophical Aspects of Ecology" which can be used in the biology course in the 9th and 11th grades. First he discusses the topic "Organisms in Their Environment". An organism and its environment form two aspects of a single phenomenon - they both assume each other and also preclude each other and thus form a dialectical unity. To put it in a philosophical manner, life is the outcome of the struggle between antitheses, which is the source and driving force of movement. The relationship between the organism and its environment can be extended to the relationship between the population and the environment and between the bio-cenosis and the environment. The relationship between pests and their destroyers and between a predator and its prey are cited as examples of ecological relations in populations. Also comments on the term bio-cenosis are provided, as well as the bio-sphere and the bio-stroma. The part of the syllabus which deals with phylogeny requires first a repetition of such notions as mutation and recombination as the source of variability. Only then should the notion of natural selection be introduced as a regulating factor.

FH

LINDSTEDT, W.
Zu einigen Problemen der philosophischen Durchdringung des Biologieunterrichts (Concerning some problems of the penetration of philosophy into biology teaching)
Biologie in der Schule, 28, 1979, No. 1, pp. 18-20

Pupils should become convinced of the objective qualities of development in nature and in society, the material essence of the world and its recognizability. This requirement can also be found in the biology syllabus for the 11th and 12th classes. It can, however, be implemented already at an earlier time - in the 5th class, where for instance the syllabus requires learning the notion of causality. Including philosophical laws of development into teaching should be an integral part of the course. This concerns especially the law of transition of quantity into quality, the law of the struggle and unity of contradictions and the law of the negation of negation. The law of the negation of negation is important in explaining development and the author does so on the basis of the example of an embryo. The law of the struggle and unity of contradictions is documented on the basis of the example of assimilation and dissimilation and/or the example of the relation between producers and consumers. The law of the transition of quantity into quality can be explained on the basis of the example of the evolution of fishes into amphibians.

FH

LÖTHER, R.

Aus der Entstehungsgeschichte des Darwinismus
(From the history of the development of Darwinism)
Biologie in der Schule, 28, 1979, No. 9, pp. 356-365.

Darwin's book "On the Origins of the Species" was published 120 years ago; it is one of the founding stones of a scientific world outlook. The book contains two fundamental and new concepts - descendental theory and evolutionary theory. Descendental theory considers species as the product of historical development and evolution theory analyses this development as a natural and necessary process. Darwinism (the term was introduced by H. Huxley), includes descendental theory and evolution theory. The ideas which Darwin published in 1859 had developed in his mind for more than 20 years, on the basis of his experiences and observations when sailing on the Beagle. The term "the struggle for survival" was understood by Darwin in figurative, not literal manner and the term "artificial selection" was used by him to designate the activities of breeders. His theory of evolution is based on the law of large numbers and Darwin's thinking was based on the principle of the self-regulation of systems. Evolutionary theory before Darwin had too little factual material available and was only the product of daring natural philosophical concepts.

FH

LÖTHER, R., KÖRNER, U.

Zu einigen weltanschaulich-ethischen Aspekten des biomedizinischen Fortschritts (Concerning some world outlook and ethical aspects of bio-medical progress)
Biologie in der Schule, 28, 1979, No. 12, pp. 497-503

This article can be used in teaching the topics "Genetics" and "The Importance of Biology". The prevailing trend in modern research is the control of living processes in the human organism. The authors first analyse the relationship between bio-medical progress and human life. An understanding of the biological laws of development makes it possible to undertake more extensive interventions into human life which are, however, connected with legal and moral problems, and which led to changes in values concerning human qualities. The article also discusses the relation between death and bio-medical progress, especially in the case of clinical death. Death is first apparent in the brain and hence a determination of death on the basis of the irreversible loss of all brain functions does not present any ethical problems. Death is the irreversible and unconpensatable loss of the integration of the part in the whole, where the brain plays a decisive role. In conclusion, the authors stress the necessity of correct ideological orientation in developing progress in the area of the natural sciences and medicine.

FH

MEZENOVA, A.I.
Vserossiyskiy prazdnik shkolnikov (An All-Russian Celebration for Pupils)
Biologiya v shkole, 53, 1979, No. 5, pp. 60-61.

At the beginning of June a celebration was held to commemorate the 25th anniversary of the existance of pupils' work brigades, which have become a part of the moral education of pupils and which organise activities which provide vocational guidance towards selecting a profession in agriculture. At present the activities of these work teams concentrate on research. Founders of the brigades participated in the celebrations, during which their importance was stressed and their successes described. Parents, who themselves work in agriculture, have a great influence upon pupils. A conference was also held concerning the importance of the activities of these work brigades for the Communist education of pupils. Also some negative aspects were criticised (for instance activities in orchards should receive greater attention). L. Brezhnev sent his greetings to the festive meeting, in which he stressed the good work these brigades are doing.

FH

SEREBRYAKOVA, M.S.
Ideyno-politicheskoe vospitaniye uchashchikhsya na urokakh biologii (The ideological and political education of pupils during biology lessons)
Biologiya v shkole, 53, 1979, No. 5, pp. 25-29.

In teaching botany in the 5th and 6th classes the author acquaints her pupils in a comprehensible form with the development of the national economy. She for instance cites the average yield per hectar of cereals in the period 1951 to 1971. In teaching zoology in the 7th class the pupils become acquainted with the tasks of animal husbandry; during excursions to collective farms and research institutes their knowledge is extended. In the 8th class elements of health care education are stressed and the advantages of the Socialist system of public health care. The author always takes into acount the regional aspect and cites examples from the close vicinity. In teaching general biology, the author for instance concentrates on problems of rasism, the danger of radio-active radiation and controlling processes taking place in the bio-sphere.

FH

SCHELLHORN, M.
Weltanschaulich-philosophische Probleme der Ökologie
(World outlook and philosophical problems of ecology)
Biologie in der Schule, 28, 1979, No. 7/8, pp.282-289.

The author concentrates on those problems which a teacher must take into consideration when teaching biology. He first analyses the objective nature of ecological problems (according to Kashmilov, people on the basis of their economic activities determine the development of the biosphere and thus also biological evolution; the scientific and technological revolution of necessity leads to a revolution in the bio-sphere.). The author goes on to discuss the ecological crisis of imperialism (he cites among others the findings of the Club of Rome) and the solution of this problem under Socialism. The world outlook and philosophical aspects and problems of ecology can be answered by finding answers to the following questions:

- what is the origin of the world, how does it exist and develop;
- what is the source of human cognition;
- what is the place of man in the world;
- what is the nature of social progress;
- what is the meaning of human life.

In conclusion the author discuses the meaning of the term bio-sphere.

FH

WESELOWSKA, A.
Wychowanie dla pokoju a program nauczania biologii w powszechnej szkole średnej (Education towards peace and the biology syllabus in general education secondary schools)
Biologia w szkole, 32, 1979, No. 5, pp. 202-204

For Polish society, peace is the highest value of mankind. This is reflected in Polish foreign policy. In 1974 E. Gierek asked the General Assembly of the United Nations that schools all over the world introduce education towards peace and coexistance with all nations. In 1978 Poland also voted in the UN for a Declaration on the Education of Nations in a Peaceful Spirit and the Maintaining of a Permanent and Just Peace. All nations are under the obligation to struggle against all manifestations of colonialism, rasism and apartheid.

The Declaration on the Education of Nations Towards Peace has now been included into the curriculum of Polish schools and into the education provided by school, the famility and all of society, including the mass media. Similar activities took place within the framework of the International Year of the Child in 1978. Education towards peace is closely connected with the new Polish model of teaching and education of the young generation on the basis of humanism, Socialist patriotism and internationalism. The author makes various suggestions for the inclusion of various problems into the biology syllabus and textbook. In biology, this concerns especially topics concerning life, its rise and development on Earth, the characteristics of flora, fauna and human beings, the relationship of man towards nature, the rational utilization of natural resources, the variability of organisms in various environments, etc. Important findings have been achieved in this area at various levels, including the cellular, tissue, organism, population on bio-cenosis levels. Other topics are cited as examples suitable for implementing education towards peace and peaceful coexistance within biology teaching.

AA

6.8.2 Atheistic education in biology teaching

GARADZHA, V.I.
Borba mezhdu naukoy i religiyey v sovremennikh usloviyakh (The struggle between science and religion under contemporary conditions)
Biologiya v shkole, 53, 1979, No. 4, pp.9-14

Science is a factor in social progress and this is in contrast to the deep decline of religion. The history of the struggle between science and religion confirms the contradictory nature of both. This is especially clear when dealing with the problem of the development of life, of different species and of man. The first blow to a biblical image of the world was provided by Darwin and his theory of evolution. Evolutionary theory makes it possible to understand the world in its movement, variability and development. At present attempts to conciliate religion with science exist, as well as the utilization of the findings of science by religion and the misuse of as yet unexplained laws of development for the claim that the possibilities of science are limited. Attempts exist to interpret the findings of scientific research in an idealistical manner. Theologians now no longer deny the fact of evolution of living nature, but evolutionary theory is limited by them to a mere hypothesis. An attempt has been made to find arguments which might confirm the correctness of basic religious theorems - concerning the existence of a "creator", the immortality of the "soul", etc. It is, for instance, claimed that the essence of the genetic code is not in DNA, but rather in information which carries "a spiritual plan". Also attempts to force upon people the opinion that scientific and technological progress carries with it "demonic" characteristics, the propensities of man towards evil and destructive tendencies have been made; however, these exist only under capitalism.

FH

SHIBNEV, B.K.
Iz opita raboti po ateisticheskomu vospitaniyu v shkolakh Dalnego Vostoka (On the experiences of implementing atheistic education in the schools of the Soviet Far East Region)
Biologiya v shkole, 53, 1979, No. 2, pp. 51-54

For more than 40 years the teacher B.K.Shibnev has been carrying out atheistic education among the members of the Udegeyets and Nanayets nationalities who live in the Primorsk and Khabarovsk regions of the Soviet Far East Region. For atheistic education to be successful, it was first necessary to become acquianted with the specific characteristics of these nationalities and their habits and culture. Among the Udegeyets, fetishism and animalism were widespread - the author cites various examples he has encountered. Another aspect of their religion is faith in witch-doctors, which is now, however, in declina. The author describes various elements of atheistic education as he himself has implemented them in teaching biology from the 4th to the 10th classes.

FH

6.8.3 Education towards socialist patriotism and proletarian internationalism in biology teaching

KHOBINA, N.V.
Patrioticheskoye i nravstvennoye vospitaniye uchashchikhsya (The patriotic and moral education of pupils)
Biologiya v shkole, 53, 1979, No. 4, pp. 30-33.

The article discusses the use which can be made of the book "The Virgin Land" by L.I. Brezhnev. The use of this book in the schools of the Kazakh Soviet Socialist Republic evokes the interest of pupils, because the book takes place in places will-known to the children. The botany course provides the greatest number of oppotunities for using this book - the author documents this on the basis of specific examples. It can also be used in the 10th class when teaching the topic "The Tasks of Contemporary Selection".

FH

NAYDENOVA, L.
Patritichnovo i internatsionalnovo vzpitanie na uchenitsite chrez obucheniyeto po biologiya
(Patriotic and internationalistic education of pupils through biology teaching)
Biologiya i khimiya, 22, 1979, No. 3, pp. 24-31. 1 tab.

In the contemporary stage of world development, where the ideological struggle between two contradictory economic systems is becoming ever sharper, the education of pupils towards socialist patriotism and socialist internationalism is becoming increasingly important.

One of the specific aspects of socialist patriotism is that it strives for unity, that it goes hand in hand with socialist internationalism and that both these elements mutually penetrate each other.

The process of forming the patriotic and internationalist consciousness of the pupils in biology teaching takes place in the following stages:

- providing objective information for learning about our and world biology, about the strategic role of the biological sciences in the present stage of the scientific and technological revolution, about nature as a general factor for improving the living conditions of the people, about ecological equilibrium, about the rational utilization of natural resources, etc.;
- convincing pupils of the importance of the information they are learning;
- developing in pupils endeavours and the need to act in accordance with the principles of socialist patriotism and internationalism.

The utilization of the biology syllabus in the 9th and 10th classes for education towards patriotism and internationalism is summed up in a table which cites methodological aspects of various topics in this context, which include the following: the development of life on Earth, contemporary theories on the origins of life, human races, racism, the adaptation of plants and animals, plant and animal selection, etc.

LR

WEISZ, W.

Erziehung zur Liebe zur Heimat bei Naturbeobachtungen in Arbeitsgemeinschaften (Education towards a love of the fatherland during natural science observations in hobby clubs)

Biologie in der Schule, 28, 1979, No. 5, pp. 177-180

The author describes his own experiences and problems with the supervision of a hobby club devoted to nature and environmental conservation, with pupils from the 5th to 8th classes. The purpose of the hobby club is not to merely mediate knowledge, but also to educate towards a love of the fatherland. This education should support the participation of pupils in nature concervation, because we can love and protect only that which we know well. The author describes in detail the methodology of work in the hobby club. One of the activities of the hobby club are meetings with specialists and also observations carried out on the basis of a long-term plan. Stress is placed on the unity of the rational and emotional.

FH

6.8.4 Work education in biology teaching

ANDERS, R.

Hohes Niveau der Arbeitserziehung (The high quality of work education)

Biologie in der Schule, 28, 1979, No. 2-3, pp. 51-53.

The autor first cites data which documents the success of collectivized agriculture in the German Democratic Republic. Further successes are, among others, dependent on the education of today´s children. The further industrialisation of agriculture also depends on complex mechanisation, concentration and specialization, cooperation and increasing the effectiveness of scientific research. The author then goes on to provide information on a polytechnical center in which 650 pupils from the 7th to 10th classes work. They have 6 workshops, specialized classrooms, garages and other modern facilities available to them.

FH

6.8.5 Polytechnical education in biology teaching

ALTMANN, A.

Prvky polytechnické výchovy v novém modelu výuky zoologie na základní škole (Elements of polytechnical education in the new model of teaching zoology in basic school)

Přírodní vědy ve škole, 30, 1978/79, No. 6, pp.203-205

Polytechnical education in the zoology course concentrates on acquainting pupils with the way in which the laws of nature are utilized in modern large scale agricultural production and aims at forming in pupils elementary skills which would make it possible for them to understand basic zooengineering procedures.

The author of the article points out aspects of polytechnical education of pupils in topics on domestic cattle, domestic poultry and the breeding of other small-scale farm animals and their importance for the economy.

VČ

BOZAROV, V. - GANEV, Z.

Swrzvane na obucheniyeto po biologiya s proizvodstvoto i proizvoditelniya trud (Linking biology teaching with production and productive work)

Biologiya i khimiya, 22, 1979, No. 1, pp.11-16.

Present day technology and the need for qualified personnel in agriculture points to the need for general and specialized education and the ability of personnel to adapt to the demands made by various professions in this branch of the economy.

According to an article written by the secretary of the Central Committee of the Communist Party of Bulgaria, Todor Zhivkov on July 18th, 1978, youth should acquire a broad general education which should include ideological, cultural and professional training. Stress is especially placed on polytechnical education. Polytechnical knowledge is of an integrating nature. It reflects various aspects of useful disciplines. The system of polytechnical training of youth includes all segments of learning: biology, the foundations of agriculture, extra-curricula activities, work education, generally beneficial work, etc. An important principle of this education is the linkage of teaching and production. But it is necessary to keep in mind correct proportions between practical activities and theoretical teaching. Important media in this context include excursions, work brigades by pupils, school workshops and the cultivation of plots of land, etc.

Polytechnical education is closely connected with vocational guidance and vocational training.

Among the important aspects of teaching, aimed at vocational guidance in agriculture, are evolutionary theory, methods of artificial selection, genetics, which all serve for increasing agricultural output and also a knowledge ecological theory.

LR

RÄUBER, A. - RÄUBER, H.

Die Samenkeimung - bereits in Klasse 5 produktionorientiert unterrichten (Teaching the topic "The Germination of Seeds" in the 5th class with an orientation towards production)

Biologie in der Schule, 28, 1979, No. 6, pp.232-235. 1 tab.

One of the permanent tasks of biology teaching is the implementation of polytechnical principles; learning basic knowledge concerning basic terms and relations forms one of its parts. This, among others, assumes taking more into account relations which exist between the conditions provided by the environment and the influence by man. When teaching the topic "The Germination of Seeds" in the 5th class, the following factors should be stressed: temperature, the production of seeds for agriculture, their transportation and storage, forming optimum conditions for germination in agricultural production. The authors then analyse the methodology of teaching topics which are linked to the forming of conditions which support germination (moisture, oxygen, temperature) based on problem teaching. Also conditions which supress germination should be understood.

FH

SHESTERA, N.Y.

Politekhnicheskiye i ekonomicheskiye znaniya na uroke (Polytechnical and economic knowledge in the course of a school lesson)

Biologiya v shkole, 53, 1979, No. 1, pp.38-50

At the All-Union Congress of Teachers, the unity of education and teaching were stressed. The biology syllabus offers a number of opportunities for implementing this requirement. Especially the syllabus for general biology makes it possible to combine topics which deal with production problems and with the agricultural policy of the Party. The effectiveness of the lesson depends on how interesting the teacher is able to make this material, how he brings it up to date and how he prepares pupils to understand it. These aspects are discussed by the author in detail on the basis of the example of some topics from the biology syllabus.

FH

6.8.6 Aesthetical education in biology teaching

KARAN, T.
Biological Studies in Art
The American Biology Teacher, 40, 1978, No. 3,
pp.160-163. 9 figs., lit. 6

The author of the article cites her own experiences in introducing art aspects into biology teaching in high school. This program makes it possible for students to prepare for instance for the future profession of an artists who works for museums, magazines, etc. The necessary conditions for being accepted to these courses are cited and the syllabus according to which they work. The students become acquainted with various painting techniques in colour and in black and white, they paint on the basis of visits to museums, according to three-dimensional models and living objects. If the course is to be successful, it must cooperate with other teaching subjects, such as biology, art, library use, etc. In conclusion the author cites a more detailed list of possible professions which can make use of this course. The article also contains illustrations, both by the author and some of her students.

SA

6.8.7 Education towards nature conservation and environmental control in biology teaching

BAJAN, C.

Rozwój i perspektywy biologicznego zwalczania szkodników roślin uprawnych (The development and outlooks of the biological struggle against the pests of cultivated plants)

Biologie w szkole, 32, 1979, No. 2, pp. 51-55, 1 photo.

The negative effects of chemically combating pests and diseases which afflict cultivated plants has led to endeavours to use to a greater extent biological methods. In biologically combating pest and disease, insectivorous birds are used, as well as predatory insects, parasites of plant pests and pathogens of insect pests. Some viruses, bacteria, rickettsae and insectovorous fungi are also of importance. Approximately 300 species of viruses attack insect pests. Viral disease are found in butterflies, hymenoptera, beetles and diphtera. The first known epizootic disease caused by the virus Baculovirus efficiens attacks the gypsy moth (Lymantria monacha L.). Rickettsia cannot be used on a mass scale against insect pests because the rickettsia attacking insects develop very slowly and are also dangerous for mammals. Bacteria have proven to be best suited for this purpose. A classical example has been the utilisation of the bacteria Bacillud thuringiensis Berl. to combat butterflies. Also fungi which are insectivorous can successfully be used against pests. They can be divided into absolute parasites, relative and conditional parasites. In absolute parasites the whole cycle takes place on the host (the moulds Coelomomycetacae and Septobasidiacae, especially the species Massospora, Entomophthora and Strongwellsea).

Relative fungi are biotrophic in the vegetative phase of development and in the sexual stage they are saprophytes. Conditional parasite fungi appear in nature as saprophytes, but under certain conditions they become parasites of insects. The author describes recent experiments with the fungus Paecilomyces, especially the species Paecilomyces farinosus and Beauveria bassiana, in combating the potatoe bug.

AA

BERCK, K. - BLECKMANN, H. - SCHWAB, C.
Naturschutz - Vorschlag für eine Unterrichtseinheit in der Sekundarstufe I (Nature conservation - a draft of a teaching unit in secondary school)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No. 3, pp. 74-79. 1 tab.

The topic "Nature Conservation" is developed into a teaching unit on the basis of a situational analysis carried out in 14 sixth and seventh classes. The study is based on a comparison of a lake which is close to a natural state and a lake which has been used for recreational purposes. Various approaches to nature conservation can be demonstrated, including the ecological, economic, psychological and ethical. Specific examples are provided for each approach.

AA

Blühende Bergwiesen verschwinden (Blooming mountain meadows are disappearing)
Naturwissenschaften im Unterricht, 27, 1979, No.3,p.73.

17% of the Alpine zone in Austria is covered by mountain meadows, but these now contain only small islands of virgin nature. These meadows are used to produce hay. On those which are found at lower altitudes, the forest is being extended (with larch, spruce and pine) while shrubs are disappearing. Grassland can be found only at higher altitudes. While the number of deer is increasing, their grazing land is decreasing. Also tourism has damaged a number of meadows. In the near future, mountain meadows will lose their significance both for hay production and forestry and for tourism.

AA

DIRLBEK, K.
Výchova k péči o životní prostředí na školách v SSSR
(Education towards environmental control in the schools of the USSR)
Přírodní vědy ve škole, 30, 1978/79, No.8, pp.291-292.

Problems of environmental control in the USSR have, in view of its huge size, different zonal and geographical specific aspects. For this reason their solution depends in individual cases on specific natural and economic conditions. This also determines the content of teaching and education in this area. Elements of environmental control are included in natural science courses in the 1st to 4th classes, where the pupils become acquainted with the natural factors of the environment, the natural wealth of their region and the economic utilization of this wealth.

In the 5th do 10th classes the biology course concerns the mutual relationship between man and nature, the hygienic aspects of nature, natural equilibrium and the role of plants on Earth.

Elements of environmental control are also taught in other teaching subjects, such as geography, history, literature and work education. Also at institutions of higher learning specialists are trained for practical and scientific work in this area, as well as for organisational and publicity activities in this area. Special departments for the training of highly qualified specialists in this field have been organised at the universities of the USSR.

VČ

EULEFELD, G.
Schulverbundnetz Umwelterziehung der Europäischen Gemeinschaft (The network of Associations for Environmental Control in schools throughout the European Economic Community)
Praxis der Naturwissenschaft-Biologie im Unterricht der Schulen, 28, 1979, No. 5, pp. 137-138.

The Institute of Pedagogical Sciences organised on November 7th do 11th 1978 a seminar for teachers from the Federal Republic of Germany, Denmark, Ireland, and Luxemburg at which the modernisation of school teaching was discussed, as well as literature, media, experiments and experiences which have been gained in education towards environmental control.

The participants had previously collaborated on a project of the European Community (1975) and now participate in the work of the Center for Problems of the Environment and Consumer Protection, which also has a group for work in the area of education towards environmental control. In the period 1975-1977 it was decided to organise a network of schools in various countries of the EEC which would deal with and verify teaching methods for a course on environmental control. At this seminar the concept of education in various countries was discussed, as well as visits to schools organised and experiences with education in this area exchanged. Ireland was chosen to coordinate the project on education towards environmental control.

A list of problems which this education should deal with is cited in the article.

AA

FRITZSCHE, H.

Umweltschutz und lassenmässige sozialistische Erziehung, Klassen 9 und 10 (The environment and class-conscious Socialist education in the 9th and 10th classes)

Biologie in der Schule, 28, 1979, No. 5, pp. 180-185

The author first analyses the relation between problems of nature conservation and environmental control on the one hand and the biology syllabus for the 9th and 10th classes on the other. For each topic he cites the ideological aspects of the problem, the activities of pupils and the opinions, convictions and behavioural attitudes which should be achieved. For some topics, problems are cited and also possible ways of solving them.

FH

GABEV, Y.I.

Prirodookhranitelnoye obucheniye na urokakh zoologii (Education towards nature conservation in zoology lessons)

Biologiya v shkole, 1979, 53, No. 5, pp. 35-36. 1 tab.

The aim of education towards nature conservation is the forming of a Communist relationship towards nature, a practical approach and active participation in its conservation, rational use and improvement. The author then analyses the biology syllabus in relation to the incidence of elements concerning nature conservation. He concentrates especially on insects and methods of biologically combating pests.

He suggests the teaching of a model lesson called "Biologically Combating Insect Pests", to which he attaches various comments also on other classes of vertebrates.

FH

GÄRTNER, H. - HOEBEL-MÄVERS, M.
Das Emissionskataster als didaktischer Rahmen
(A cadaster of emissions as a didactical aid)
Naturwissenschaften im Unterricht - Biologie, 27, 1979,
No.4, pp. 111-117. 4 figs., 2 tabs.

An emission cadaster can be made as a general "map" for endeavours to combat air pollution. It is shown to be a useful didactical aid for teaching and work with pupils. It provides pupils with scientific material for their study of environmental protection. Existing technical facilities available in schools make it possible to use this method at any time. The specific geographical environment of the school can serve as a stimulus for the creative work of pupils within the regional situation. The pupils should first become acquainted with the scientific content and social impact of air pollution. They measure the level of pollution and mark a map according to their findings. Then the sources of industrial emissions are indicated in the map, the quantity of various gases measured, their temperature, the damage they do, their frequency, quantity and duration. The sources of emissions can include points or areas, factories, industrial waste disposal plants, various means of transportation, households and smaller plants.

AA

GEROSA, K.
Es geht uns alle an (A concern of all of us)
Praxis der Naturwissenschaft-Biologie im Unterricht
der Schulen, 28, 1979, No.9, pp.225-226.

The Federal Republic of Germany, as a highly industrialized country, has come to feel the consequences of economic growth and the fact that further parts of the natural environment are disappearing, as well as the existence of air and water pollution, and the depletion of energy and raw materials. As a result of the deterioration of the quality of the environment the number of persons ill with civilisational deseases is increasing. Every 6th inhabitant of the Federal Republic suffers from mental disease. The German Association for Nature Conservation has over three million members and over one hunderd affiliated organisations. Its aim is to protect the environment in the Federal Republic, as well as the health of its inhabitants, its flora and fauna. The German Federal Association for Nature Conservation, within the framework of its activities provides from 370 000 to 430 000 jobs annually. Environmental control is at present becoming a part of world policy. The eeological development of the country is also becoming a matter of government policy. The basic program of the German Association for Nature Conservation is an endeavour to assure a quantitative growth of the national economy, while at the same time maintaining a healthy environment.

AA

HAHN, M.
Wie kommt der Mäusenbussard zu seiner Beute ?
(How does the common buzzard overcome its prey?)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No. 11, pp. 328-332. 1 tab.

The author describes how to use the common buzzard to acquaint pupils with problems of environmental control and also the problem of birds of prey and their importance for nature. This topic is also of current interest, because in the Federal Republic the buzzard is expected to be freed for hunting again. The buzzard as a representative of birds of prey can serve for teaching about autecological relations in the animal community and food chains, which form the foundation of biological equilibrium. A verification of what has been learn can be carried out by screening a film on buzzards.

AA

HOWE, S.M.
Selenium: Poison and Preventive
The American Biology Teacher, 40, 1978, No.7, pp.406-409, 433-434.

The author acquaints readers with some of the biological after-effects of selenium and its compounds on human health. She first deals with selenosis, a disease found both in animals and man, which was the first selenium related disease discovered. Also the influence of selenium on plants is described and the geographical distribution of selenium found in the soil. Selenium penetrates the human organism from plant and animal food and also in a secondary manner, through air pollution. Examples of selenium poisoning are described, for instance by the halogenates. However, selenium is at the same time a necessary tracer element, which is found in the organism of animals. Experiments with the effects of selenium on the human organism are described, as well as a diagnosis of selenium poisoning and the carcinogenic effect of the element.

RA

HÜBNER, R.

Aktuelle Hinweise über Informations- und Unterrichtsmateriallen für den Biologielehrer (Current sources of information and teaching material for biology teachers)

Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.4, p. 126.

The Federal Center for Political Education has published a number of informative publications for teachers, for instance on the negative effects of smoking, a map of clean waters in the Federal Republic, problems of nuclear radiation in nuclear power plants, etc. As far as environmental control is concerned, publications have been issued on plants which serve as bio-indicators for measuring the pollution of the environment, as well as on water as a natural object, as the source of life, etc. Problems of environmental pollution are dealt with in a publication concerning the amount of pollen and spores in polluted air and about the environmental catastrophy in the Italian town of Soveso. These materials can be used for biology teaching in all types of schools.

AA

HUPPERT, G.N. - LUDWIG, G.
Human Impact on the Inner Gorge of Grand Canyon National Park
The American Biology Teacher, 40, 1978, No.1, pp.13-16.
1 fig.

The Grand Canyon National Park and especially its inner gorge are visited annually by increasing numbers of tourists, especially since th sixties. This causes problems in connection with nature conservation in the vicinity of the river that runs through the canyon. The authors of the article first describe some factors which have caused larger numbers of tourists to visit the canyon, as well as measures to counter-act their negative influence. They also deal in greater detail with some of the more pressing problems, such as refuse collection and the provision of sanitary facilities. Also the problem of destruction of the flora in the vicinity of the river and the soil erosion this causes is a problem. In connection with the increasing number of camping sites, the danger of fire is greater. The staff of the National Park have also encountered cases of vandalism and the destruction of historical monuments. In conclusion, the authors briefly discuss the problem of bathing in the river.

RA

Chancen für den Steinadler (Giving the Golden eagle a chance)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No. 3, p. 79

Since the Golden eagle has become a fully protected bird between 200 and 300 pairs of this bird of prey have been nesting in the mountains of Scotland and in southwest Scotland. In the past, the Golden eagle was hunted because it was widely believed that its main food were young lambs. It was, however, found that it hunts above all blue hares and rabbits, as well as the snow goose The rearing of young eagles takes four months.

AA

IRSCH, W.
Rote Liste für Tiere und Pflanzen (The Red List of plants and animals)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.3, pp.95-96

The Federal Republic of Germany is the first country in the world to issue a Red List of threatened and protected flora and fauna. The list itself and its documentation are the outcome of long-term work of a number of scientific teams and individuals, done since 1972, and the outcome of their cooperation with the Ministry of Nutrition, Agriculture and Forestry. It is assumed that in the Federal Republic there are 2 500 species of plants and between 45 and 50 000 species of animals. Of the total number of mammals, 60 % are either already extinct or threatened. Since the beginning of the century 19 species of birds have become extinct and 40 species are threatened. The Red List includes 57 % of the birds living on the territory of the Federal Republic, 67 % of the reptiles, and 58 % of the amphibians. One third of the 135 species of fish are threatened by polluted water. Chemicals used in agriculture threaten 50 % of libellulae. Of 77 species, 21 are already extinct. Of 1 420 species of butterflies, 518 are on the Red List. The swallowtail butterfly is the most threatened with extinction.

AA

JACOBSEN, H.P.

Niedere Pflanzen des Süsswassers als Gegenstand landeskultureller Schülerarbeiten (The lower fresh water plants as objects of work by pupils in teaching nature conservation)

Biologie in der Schule, 28, 1979, No.1, pp.21-22.
2 figs.

Lower plants are on the one hand primary producers and on the other hand destroyers(of heterotrophic bacteria, fungi). Plankton and organisms found in the benthos can be the subject of study by pupils in a hobby club; the author describes the activities of such a club (for instance the qualitative and quantitative study of blue algae). He also describes a summary table of characteristics and a bibliography.

FH

JAUS, H.H.

The Effect of Environmental Education Instruction on Teachers´ Attitudes toward Teaching Environmental Education

Science Education, 62, 1978, No. 1, pp. 79-84.

The article deals with the problem of teaching environmental education in primary and secondary school. In spite of the fact that this subject is mandatory, much depends on the teacher´s attitude towards the subject. In the context of other teaching subjects it has been shown that teachers tend to have a positive attitude towards those subjects in which they continue in their own training. The author of the article discusses this problem in the context of teaching environmental education. A project was carried out which included 51 teachers. The course of the project and the methodology used are described in detail;

the findings were tested with a t-test. It was found that those teachers who had undergone instruction on environmental education had a much more active attitude towards this subject, than those who had not undergone the training.

RA

JÄKEL, U.

Eingriffe in die Natur und ihre Folgen am Beispiel der Verwendung von Schädlings Bekämpfungsmitteln
(Interventions into nature and their consequences on the basis of the example of the use of pestacides)
Biologieunterricht, 15, 1979, No.1, pp.26-40.

The conservation of the natural environment in the Federal Republic of Germany is governed by a law from July 14th, 1976. The conservation of the environment is today considered to be the task of the whole country; all of society requires the forming of a new orientation of man towards his own environment at all levels of education. This is being implemented through biology teaching in all secondary schools. The author, on the basis of the example of the biology syllabus concerning problems of the environment for the 6th class in Baden-Wirtenberg, provides information on a project which included 37 pupils, of this number 32 girls. The author also describes in detail the course of two teaching lessons concerning food chains and combating pests, as well as the transmission and replenishement of poisons in food chains. The class studied the effect of pestacide sprays against insects and their role in food chains (spray - insects - birds, DDT - animals - man, DDT - plants - animals - man).

AA

JERNIGAN, H.D. - WIERSCH, L.
Developing Positive Student Attitudes Towards the Environment
The American Biology Teacher, 40, 1978, No.1, pp.30-35.
3 figs., lit. 5

The authors of the article sum up their experiences with a so-called verification excercise for students in urban areas. Its aim is to teach children to learn about nature through their perception, to imitate how animals perceive their environment, to carry out experiments which demonstrate food chains and to make conclusions on the basis of what they have learnt. A list of aids is cited and work procedures for use during excursions, which are summed up into 3 points, are described. During the excercise the students are asked to answer several questions. For instance after covering their eyes and ears for a few moments they are able to describe what they have perceived with their remaining senses (above all the flow of air, sunshine, smells and tactile perceptions); they are for instance able to determine flowers on the basis of their smell. After these experiments, a discussion follows. The article also describes a so-called realization excercise in which students answer a total of 14 questions, including Who am I ? Do good and evil exist ? What is reality ? etc.

RA

KLEINE, U.

Umwelterziehung in städtischer Umgebung - Ein Bericht über die 3. Europarats-Studienkonferenz zum Thema Umwelterziehung (Environmental education in urban areas - Report of the 3rd European Council Study Conference on the topic of environmental control)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.6, pp. 185-190. 1 worksheet, 1 tab.

A prerequisite for the correct behaviour of people in nature and the environment is knowledge of environmental control learnt in school. In the course of this conference a report was heard on how an urban environment can be used, with very small costs, for environmental education. In 1977 a similar conference was held in the city of Bristol in Great Britain which drafted an educational concept for using an urban environment as a model for environmental education. The further development of this model and its application in schools has contributed to teaching and made it easier for students to learn. In school, pupils should become convinced of the necessity of active environmental control. Motivation should be improved, as well as the participation of students in dealing with actual problems and improving relations between teachers and students in the course of various activities for environmental control. This in turn will contribute to the improved moral and mental development of students.

AA

KLETEČKA, J.
Vliv některých emisí z motorových vozidel na rostliny
(The influence of some emissions from motor vehicles upon plants)
Přírodní vědy ve škole, 30, 1978/79, No. 4, pp.124-125.
1 tab.

The exhaust gases from motor vehicles contain over 150 chemical components. Their influence upon living organisms depends above all on the qualities of the organism, the concentration of damaging chemicals, their chemical composition, duration of influence and the presence of other toxic substances, etc.

The influence of the chemical composition of the toxic material upon the biological functions of a plant can be judged from several points of view, such as for instance the ecological (unsaturated hydrocarbon and nitrogen oxide contribute to the development of smog), from the genetical (polycyclical aromatic hydrocarbons, nitrogen oxides and perhaps also lead have mutagenic and possibly also carcinogenic effects), and from the toxicological (hydrocarbon, aldehydes).

The contamination of plants by toxic substances from exhaust gases depends above all on the distance of the plant from the road, the specie of plant and the nature of its surface, the hight of various parts of the plant from the road, whether the plant is regularly washed by rainfall, the intensity of road traffic, the duration of time in which the plant is exposed to the toxic substance, etc.

VČ

KONOVALOV, V.I. - ASTAKHOV, A.I.

Uchastiye shkolnikov v okhrane prirodi rayona BaMa (The participation of pupils in the conservation of nature in the vicinity of the Baikal-Amur Railway)

Biologiya v shkole, 53, 1979, No.6, pp. 49-50

60 schools which are attended by more than 22 000 pupils have already been built in the vicinity of the Baikal-Amur Railway. A number of these schools participate in environmental control of the vicinity of their schools and homes. The authors cite individual specific examples from various schools.

FH

KUČÍREK, L.

Jalovec - chráněná rostlina (The juniper - a protected plant)

Přírodní vědy ve škole, 30, 1978/79, No.9, p.331

The juniper is found all over Euroasia, from the steppe up to the tundra and high up into the mountains. Its widespead incidence is due to its adaptability and the fact that it is very undemanding.

Originally the juniper was found only to a limited scope due to extensive forests. As the forests have receded, this undemanding photophilous plant, which is fairly resistant to the gnawing of animals because of its prickly needles, has become widespread in pastures or sparse grazing forests. At present, due to intensive agricultural and forestry cultivation, the juniper is gradually receding even further and can no longer be found in places where previously it had penetrated due to the activities of man. When pastures are not grazed regularly, they are rapidly overrun by forests and this has a negative influence on the juniper. Especially in Bohemia the juniper is clearly receding, while in

Slovakia it more often still finds good conditions for its proliferation. In the future it will probably have to be included into the list of protected plants.

VČ

KULIKOVA, G.V.
Yuniye lesnichiye - narodnomu khozyastvu (Young foresters contribute to the national economy)
Biologiya v shkole, 53, 1979, No. 4, pp.52-55.

A decade has passed since forestry administrations have been founded. In Soviet Bashkiriya, with its six million hectars of forests, 223 forestry administrations and 61 other facilities serve timber production. One of the ways in which personnel for forestry is trained are school forestry brigades, of which there are 289. In 1978 3.8 % of the graduates of the schools in the vicinity worked in forestry enterprises. School forestry administrations plant young trees, are active in forestry conservation and have programs for learning about the technical and economic problems of forestry. The author cites a number of specific examples, which illustrate the contribution which school forestry administrations make to the national economy.

FH

KVASNIČKOVÁ, D.
Pojetí výchovy k péči o životní prostředí na našich školách (Concerning the concept of environmental education in our schools)
Přírodní vědy ve škole, 30, 1978/79, No.9, pp.322-323

Education towards environmental control is organized in two basic stages. In the first stage specific measures are taken to improve environmental education both in schools and in extra-curricula forms of activities. Methodological instructions have also been issued for all general education teaching subjects. The graduates of secondary schools can now attend special courses on this subject and also institutions of higher learning organize post-graduate courses.

In the second stage the aim is to develop a system of this education in various educational areas. The initial role should be played by school, which is the only educational institution which systematically, in an organised fashion and with the warrented social aims influences directly all youth and indirectly, through young people, also the older generation. For this reason the Ministry of Education of the Czech Socialist Republic already in 1975 set up a research team to deal with the problem of environmental education in schools of all levels in Czechoslovakia. The basic aim of this team work is research into an environmental education system to be implemented in the school system and the model development and the organisational prerequisites of such a system.

VČ

MOHN, E.
Aktion Vogelschutz in der Schule (The project bird protection in school)
Naturwissenschaften im Unterricht, 27, 1979, No.9, pp.281-285, 3 figs.

The author describes a method of active nature conservation in school work and how it was motivated by the teacher. The pupils built nest boxes for birds and undertook other activities aimed at the protection of birds. It is not sufficient to tell pupils about the Red List of protected plants and animals, but they should be guided towards active measures for nature conservation. Various opportunities for cooperation between teachers, forestry officials and teachers of workshop exist, which can take place within the framework of hobby clubs; they find a positive response not only among parents but all of society. A drawing for making a nesting box is attached.

AA

OBŠATNÍK, J.

Cieľavedomou výchovou mládeže za zlepšenie a ochranu životného prostredia (The purposeful education of youth towards improving and conserving the environment)

Přírodní vědy ve škole, 30, 1978/79, No. 3, pp. 92-93

The Regional Pedagogical Institute in Prešov has set up a specialized committee on methodology for dealing with environmental problems. This committee has organized seminars, consultation, competitions and a regional school competition all concerning environmental control. Seminars on the topic "Man and the Environment" have been very successful. The regional school competition included the following activities: The creation and conservation of the environment in the immediate vicinity of the school, activities which are beneficial for all of society, as well as educational, cultural and sports activities.

VČ

ODELL, R.

Living Space: Land Use or Misuse ?

The American Biology Teacher, 40, 1978, No.2, pp.111-114

lit. 3

The author discusses social and physical pressures on living space and some of the methods used to deal with this problem. In the author's opinion, Americans tend to have an agressive stand towards the utilization of living space. He cites several examples, when for instance a lake had to be closed down, which had been open to the public, because of the extensive devastation of the lake's vicinity. The demands made upon living space are increasing and many people are buying so-called second homes - recreational houses which are often larger then their urban dwelling. The author also discusses problems of population growth and the demands upon living space which follow from this. Land is being use up for the construction of housing units, commercial areas, industry, etc. Another extensive source of pressure is the demand for free space. Other land is needed for the cultivation of crops, which provide us with food, clothing, etc. The land is also a source of water. Specific areas of land are protected, because of their cultural or natural value. In conclusion the problem of gaining new land is discussed and the problems connected with rural life.

RA

RAFFIN, VIAUX-PELLERIN, MATTIS

Quinze ans de parcs nationaux français (15 years of Franch national parks)

Biologie, Géologie, 66, 1979, No.3, pp.418-419

In May 1979 the Committee on Nature Conservation held a meeting in Paris to discuss French national parks. It was found that national parks have an important role to play, among others also as places for the teaching of the natural sciences and nature conservation. Their further extension (there are now four of them) will be in the interests of educational policy and the reaching of youth from urban areas; they are also needed by the teachers themselves.

LR

NOLL, M.

Ein biochemischer Test zum wirkungsspezifischen Nachweis von insektiziden Phosphorsäureestern (Biochemical tests to prove the specific effect of phosphoric ester insecticides)

Praxis der Naturwissenschaften-Biologie im Unterricht der Schulen, 28, 1979, No. 3, pp. 62-65. 6 figs.

The author deals with an important ecological topic - the influence of poisons on the environment. He wishes to stress complex biological relations which exist at the molecular level. A number of halogen hydrocarbons are very dangerous for the environment. For this reason phosphoric esters are now used more often, especially those compounds which have a systematic effect. These substances are, however, highly toxic for water and soil organisms, for warm blooded organisms. They are also highly resistant towards the environment. Proof of their presence requires the use of expensive chemical methods or special bio-tests. The problem of experimental organisms causes ethical problems. Phosphoric esters have a negative effect on the activity of synapses in nervous systems, i.e. of acetyl-choline and amino-alcohol-choline. Besides noradrenaline, these substances are the most important transmitters of excitation. The author also explains the effect of acetyl-choline, the degradation of transmitters and the effect of the enzyme cholinesterasis. Its effect is to slow down the effect of phosphoric ester. The author explains the causes of death of insects, as well as the consequences which follow from the insecticide effects of phosphoric ester. A list and description of the chemicals and instruments needed are attached. The slowing down substance is dimethost (a 40% solution), out of which a dilution of 1:100 in acetone or alcohol is prepared for the purpose of experiments.

AA

SCHLOSSER, S.

Die gesellschaftlichen Anforderungen an die Naturschutzgebiete der DDR (The demands made by society on protected areas in the German Democratic Republic) Biologie in der Schule, 28, 1979, No.10, pp.436-438.

A present there are 735 protected areas on the territory of the G.D.R., which have a total area of 90 742 hectars of land (that is 0.84 % of the territory of the G.D.R.). They are important for science, culture and education. The author defines the demands made by society as scientific, economic, cultural and pedagogical tasks, which can be carried out in these areas. The author lists ten various tasks from the scientific research point of view, seven from the cultural and ethical point of view, five from the educational and teaching point of view and five from the economic point of view. One task is formulated from the point of view of recreation and the use of leisure-time.

FH

Schützt die Vogelwelt - lasst den frei lebenden Vögeln die Freiheit ! (Protect the world of birds and let free living birds keep their freedom !) Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.6, p. 174.

Do not buy forest birds and try to convince your fiends not to do so ! The number of freely living birds has greatly diminished, especially Northern birds which migrate to the temperature zones of Europe in winter time, are threatened. Also the demand for exotic birds has caused damage to nature in the tropical and subtropical areas. Within one year, nine out of ten imported birds are no longer alive.

Do not buy a single bird caught in a natural environment. This is a challange for all true nature lovers !

AA

SIUTA, J.
Ochrona i rekultywacja zasobów gleboworoślinnych (The conservation and re-cultivation of soil for crops)
Biologia w szkole, 32, 1979, No.5, pp. 195-202. 5 figs.

The foundation of agriculture is the soil. The quality of vegetation is a good indicator of the state and properties of the soil. Various degradation processes take place in the soil: relative degradation (where the activity of the soil after changes have taken place, does not differ from its previous state) and to real degradation (when the activity of the soil is permanently depleated). In this latter process nutrients for plants in the soil become exhausted, the soil has too much acid or alkaline, the soil is damaged by the presence of phytotoxic substances, too much salt, by too extensive loss of humus or moisture, by too much moisture, erosion, by damaging the structure of the soil, by the crumbling of the surface of biologically effective components in soil and by biological deterioration. In Poland, the soil is most depleted by the exhaustion of nutrients in the soil and disturbed ion equilibrium. Cultivated plants take K^+ and NH_4^+, while letting H^+ loose and this causes an increase in the acid content of the soil and an increase in its phytotoxic properties. In some areas of Poland, the soil has too little calcium and then the presence of sulpher has a negative effect, colloid particles disintegrate and the physical properties of the soil tend to change. In this case prevention can be achieved by providing calcium to the soil. The properties of degraded soil improves by adding humus (55-65-70 tons per hectar). However, sandy soil would require larger quantities of humus and this cannot be done by agricultural enterprises. Essentially the problem is to provide more bio-mass than the soil is capable of producing on its own. For this reason ash and some types of lignite, which contains calcium, can be used. Thermal power stations provide up to 50 tons of ash per hectar of agricultural soil (the optimum dose would be 100 tons). This ash also contains potassium and phosphor. In this manner waste materials are utilized for fertilization. But the soil should also be protected against nitrogen compounds. The article discusses the role of pollution in the vicinity of industrial plants and how to prevent phytotoxic properties in the soil.

AA

STAŃCZYKOWSKA, A.
Program zagospodarowania Wisły (A program for developing the Vistula river)
Biologia w szkole, 32, 1979, No. 2, pp. 56-59

The Vistula is a symbol all that is Polish. It is 1050 km long and its basin is formed by 54% of Polish territory. Among Polish rivers it has the largest supply of water, but in comparison to other European rivers it has a relatively small amount of water. 29 % of its course is strongly polluted and cannot be utilized economically, 54 % is formed by water that is in the 3rd class of utility, usable only for industrial plants and for some agricultural purposes and only 27 % of its course has 2nd class water, which can be utilized for recreation, for breeding fish (with the exception of the Salminidae) and for agriculture. Pollution is caused by chemicals used in agriculture and by saline water from coal mines. Vistula water treated for the use of the population is used only in Warsaw, Płock and partially in Krakow. The Vistula is suitable for shipping only to a very limited extent. Only 5 million tons of goods annually are transported on it. Only 10 % of its electrical potential is made use of. In 1978 a decision was made concerning the complex economic utilization of the Vistula river and its water sources. The project divides the river into the upper, central and lower parts. It is assumed that its utilization by industry will increase, as well as in urban development, agriculture, for the construction of electric power stations, reservoirs and cascades. Also the regulation of the waterway is planned, the utilization of its water for agriculture and transportation, the development of recreation and tourism and for environmental control. Treatment plants and reservoirs will be built and measures taken to overcome pollution by chemicals and oil. The plan for developing the Vistula river is scheduled for 20 years. Also the ecosystems in the vicinity of the Vistula will be improved.

AA

STERNBERG, H.
Umweltgestaltung verpflichtet zu Umweltschutz (Rehnaer Lehrpfade - eine Möglichkeit der Landschaftsgestaltung) (Changes in the close vicinity require conservation - the Rehna educational trail provides an opportunity for forming the landscape) Biologie in der Schule, 28, 1979, No. 11, pp.475-480. 3 figs.

The town of Rhena (in the Schwerin region) has some very interesting trees. In 1954 a park was founded and developed as an educational trail. It has a historical part, a part devoted to trees and shrubs, perennials, annuals and sections for asexual reproduction, for various plant families, protected plants, etc. The author describes various sections in detail.

FH

SHAPOKENE, E.Y. - YANONIS, A.D., SHAPOKA, Y.
Kabinet prirodookhrannogo prosveshcheniya (A study center for nature conservation)
Biologiya v shkole, 53, 1979, No. 5, pp. 38-43, 3 figs.

Study centers are part of the material basis of teaching and their facilities and aids should be adequate to their function. The authors describe the various facilities and furnishings such study centers should have and make various suggestion for nature conservation activities. The conservation of nature is becoming an acute social and economic problem, which requires complex study. The study center should serve as a methodological and research center for both reachers and students. The authors describe the activities of a specific study center which concentrated on six topics (the development of the planet Earth and its bio-sphere; the mutual relation between society and nature; nature conservation within the Republic; nature conservation and school; the resources of the bio-sphere and its conservation and rational utilization; the aesthetical wealth of nature and its use). Suggestions are also made for organising exhibition on these topics, which might include information placed on wall posters, models, specialized books, bibliographies, methodological literature, periodicals and dictionaries.

FH

TREITZ, P.
Naturschutz und Tourismus heute. Informationsveranstaltung der Obersten Naturschutzbehörde Saar (Nature conservation and tourism today. An informative exhibition organized by the Nature Conservation Administration of the Saarland)
Praxis der Naturwissenschaften-Biologie im Unterricht der Schulen, 28, 1979, No. 6, pp. 166-167.

While it is true that the Saarland does not have important tourist attractions, it still has the opportunity to make use of tourism. What is needed, however, is greater care devoted to the landscape, its beauties and the maintaining of a healthy environment. Any intervention into the landscape which might damage it, also damages tourism. Also important is the conservation of flora and fauna in relation to tourism. Maintaining a beautiful and healthy landscape is the common task of those who wish to conserve nature and to develop tourism.

AA

TREITZ, P.
Vogelfutter für 12 Millionen DM. Alle Jahre wieder: Winterfütterung - ja oder nein ? (Food for birds for 12 million DM. As in other years: should birds be fed in winter or not ?)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 1, pp. 25-26.

If every citizen of the Federal Republic of Germany devoted only 20 pfennig annually to feed birds, this would add to an annual total of 12 million DM. Actually the sum thus spent is much larger, while associations devoted to nature conservation and environmental control have much less money available. Feeding birds in the winter has its positive aspects, since it forms among youth a positive attitude towards nature, extends their knowledge of fauna and brings publicity to bird conservation. However, there are also some problems connected with the winter feeding of birds. Birds which are really threatened do not come to feed-boxes, to which the most proliferate birds usually come. The mild winters which we have recently had, together with feeding by people, make it possible for less healthy individuals among the bird population to survive. The problem of threatened birds should have priority ! Thus not only song birds should receive our aid, but also owls, birds of prey and water fowl. Often healthy birds catch infections at feeding boxes (especially Salmonella). For this reason feed boxes should often be cleaned.

AA

Tierschutz im Unterricht. Das Tierschutzgesetz
(Animal conservation in teaching. The law on animal conservation)
Naturwissenschaften im Unterricht, 27, 1979, No.12, pp.379-380.

The law on animal conservation issued on November 24th 1933 is now obsolete. During this time a new field of science has developed; ethology, technology has advanced and the economic system of the Federal Republic of Germany has changed. The conservation of animals and how to deal with this tasks should be part of a new law on this problem. Since July 24th 1972 a new law has been issued for the conservation of animals. It protects not only the animals whose existence is threatened, but also the environment which makes their life possible. It is forbidden to cause animals pain and suffering. When animals are bred, they must be taken care of, receive sufficient food and care, dwelling, they must have sufficient movement and the care of a veterinary surgeon. In biology teaching use should be made of this new law for the protection of animals.

AA

VARGHA, B.
Ökológiai ismeretek - környezetunk védelme
(The findings of ecology - the conservation of our environment)
A Biológia tanítas, 17, 1978, No.3, pp. 71-72

On the basis of the findings of a conference held in Tbilisi (USSR) in 1977 concerning problems of environmental contol and its inclusion into school teaching and the educational process, the author discusses the principles of this education and teaching.

6.8.8 Health education in biology teaching

DYLLA, M.

Querschnittlähmung mit beschäftigungstherapeutischer Behandlung (Paralysis caused by the transverse fracture of the spinal cord and therapeutic measures)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 10, pp. 275-277.

In automobile accidents, labour accidents and in sports the transverse total or partial fracture of the spinal cord can occur. Usually this trauma is accompanied by damage to the vertebra, which in turn leads to paralysis of motor, sensory and/or vegetative systems. Among young people this accident often occurs when jumping into unfamiliar water. Earlier, up to 80 % of these patients died due to infections of the urinery tract. At present therapy has decreased the number of deaths to 3-4%. When this accident occurs it is first necessary to deal with the shock and overcome breathing difficulties, then to deal with infection in the urinery tract and to stabilize the fracture. The author stresses the necessity of providing information in schools to prevent these serious accidents.

AA

FREOUR, P.

J'accuse le tabac (I accuse tobacco)
Biologie, Géologie, 66, 1979, No. 1, pp. 80-81

A physician and university professor points to 7 different damaging effects of smoking, especially cigarettes, as he himself has come to know them at the clinic at the University of Bordeaux. He points out that numerous research findings in the

United States, Great Britain and on the European continent have come to similar conclusions. The article can serve very well for biology teaching.

LP

HOMOLA, J.
Voda v číslech (Figures about water)
Přírodní vědy ve škole, 30, 1978/79, No.4, pp.133-134.
1 tab.

The article cites 12 points which are summed up in the Charter on Water, which has been accepted by the World Health Organisation and UNESCO. The article contains interesting information on the relationship between man and water. For instance the average daily consumption of water by man is 35 g per kilo of body weight; annualy approximately 5 million people die throughout the world as the result of infections diseases which are caused by water which is a health hazzard.

VČ

JANCZEWSKA, A.
Film w kształtowaniu negatywnego stosunku do alkoholizmu (A film for educating a negative attitude towards alcoholism)
Biologia w szkole, 32, 1979, No. 4, pp. 176-177.

Education against alcoholism in general education schools takes place in biology lessons devoted to hygiene. Alcoholism is a biological, psychological and social problem. The author provides information about a film which shows the processes which take place in the body of an alcoholic, as well as the psychological and social consequences of alcoholism and its influence on the children of alcoholics.

The effect of self-control upon the conscious behaviour of man is stressed. In the struggle against alcoholism, schools make use of films, pictures, models, statistical yearbooks. The author describes the course of such a lesson, where a film is used in problem teaching.

AA

LAASS, W.
Einige Grundlagen der Ersten Hilfe (The foundations of first aid)
Biologie in der Schule, 28, 1979, No. 6, pp. 267-270.

The importance of teaching first aid is not doubted, but most teachers are unable to teach their pupils the relevant skills. Of special importance in this context are hobby clubs devoted to health education and courses organized by the German Red Cross. This aspect is also important in the teaching subject of defence education. The author cites the most important measures which can lead to the saving of lives. First he discusses artificial respiration (he stresses the advantages of breathing from mouth to nose in contrast to breathing from mouth to mouth) and its combination with heart massage. He also discusses the principles of first aid for burns.

FH

KOVNER, Y.A.
Trenirovka golosnogo aparata (Training the voice)
Biologiya v shkole, 53, 1979, No. 6, pp. 44-45.

A teacher should know how to prevent disease of the voice apparatus. Excercises serve this end, which should be carried out outdoors, 1.5 to 2 hours after a meal. The excercise is at first done three to four times, later seven to ten times a day. The author describes four excercises for correct breathing, five excercises for training articulation and four excercises for developing correct pronunciation.

FH

LUTTON, L.M.

CPR Instruction in a Human Anatomy Class

The American Biology Teacher, 40, 1978, No. 7, p. 437.

The article provides brief information on cardiopulmonary resuscitation (CPR), which the author teaches within the framework of a course on human anatomy and physiology. First some facts which point to the importance of the subject for saving human lives are summed up. Then an outline of the lesson is provided. The students are first acquainted with the structure and function of blood circulation. Then practical training follows, which is carried out with the aid of a qualified Red Cross instructor. The lesson is not mandatory, but students tend to have an interest in it. They learn to diagnose a situation in which CPR is needed and how to overcome complications, such as vomitting or a throat wound. Practical training is done with children and adults.

RA

MALCHEREK, R.

Unterrichtsinhalt Drogen und Suchtmittel. "Alkohol-Droge Nummer 1" (The teaching subject of alcoholic bevereges, "Alcohol as Drug No.1")

Praxis der Naturwissenschaften-Biologie im Unterricht der Schulen, 28, 1979, No. 3, pp. 79-81.

The Institute for Health Education has published a new teaching manual called "Alcohol - Drug No. 1".

It is intended for secondary schools, has 91 pages and can be used not only in the framework of biology teaching but also in teaching German, the social sciences, religion or chemistry. The approach to this topic is interdisciplinary. The problem of alcoholic bevereges is both social and political. The manual is divided into 5 chapters, and each is printed on paper of a different colour. The problem of drinking alcohol is dealt with in a comprehensive manner - alcoholic bevereges and the home, alcoholic bevereges and social relations, the consequences of alcoholism, alcohol chemistry. Suggestion for various experiments which can be done in school are included. The manual also includes a bibliography and a list of films and slides on this topic; it is thus a valuable aid to teachers.

AA

MALCHEREK, R.
Unterrichtsinhalt Drogen und Suchmittel. (Unterrichtseinheit zum Thema Drogen "Sie sollten wissen was sie tun!") (The teaching subject of drugs and addiction. The teaching topic on the subject of drugs, "You should know what you are doing!")
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 5, pp. 135-137.

Another aid published by the Institute for Health Education concerns drugs and addiction. It has 55 pages and worksheets for pupils; it is written for secondary schools. Teaching about drugs and addiction first assumes that pupils fill in, anonymously, a questionnaire which verifies how much they know about this topic. Then interviews with parents are organized and a lecture for all parents in the school. The lessen itself then deals with drug abuse, the law, how individual drugs are produced (products made of hemp, hallucinogens, ataractics, opiates, nasal media). In conclusion a two hour lesson is described which makes use of films which provide information on drug addiction, their influence and the dangers they pose. Also the influence of drugs on the human organism are discussed, why people take drugs and how their use spreads. During these lessons, no experiments should be undertaken!

AA

MALCHEREK, R.
Unterrichtseinheit Drogen und Suchmittel (Unterrichtseinheit zum Thema Rauchen "Tabak - Ein gefährliches Genussmittel" (On the teaching subject of drugs and addiction (The teaching topic on smoking, "Tobacco - a dangerous addiction medium")
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 2, pp. 53-54.

The Institute for Health Education has published a teaching manual on smoking and tobacco addiction. It costs 6 DM and contains worksheets for use in class, a letter to parents and a lecture for parents. It can be used for the 5th to 10th classes of all types of schools. The teaching lesson has three stages: motivation, information and activities with recommended experients (on substances present in tobacco smoke, an experiment with smoking tobacco and nastrium (Indian cress) seeds, the path of smoke in the human respiratory system, the toxic effects of nicotine, tar in cigarette smoke). Also smoking related diseases are discussed at length (the influence of nicotine, tar and carbon dioxide). Graphs and diagrams are recommended for class work which show the effect of these substances on the smoker, on pregnant women and the consequences of smoking by future mothers during pregnancy on neonates. In conclusion various activities against smoking among youth are recommended.

AA

ZIPKO, S.J.
"Medical Awareness Month" at a Junior High School
The American Biology Teacher, 40, 1978, No. 8, pp.492-496. 6 figs.

The author describes his own experiences with a small-scale course called Medical Awareness Month. The course was introduced in order to help students understand the nature of disease and the importance of preventive care and maintaining good health. The course follows seven goals and subject matter which are aimed at supporting sympathy on the part of students toward sick persons, learning about the circulation of air between the lungs, blood and cells under normal and pathological conditions, studying comparative anatomy and physiology of the circulatory and respiratory systems in various animals, learning about the danger posed by cigarettes and the consumption of other carinogens, a clarification of the factors which are connected with the development of cardiac disease, cancer and physiological disorders, verifying the effectiveness of an interdisciplinary approach to a clarification of the concept of disease and making it possible for teachers of other subjects to participate in a discussion on various aspects of disease. The author also describes activities which are carried out by students in class, beginning with experiments with water fleas, through worms and fish, up to a study of human blood circulation and respiration.

RA

6.8.9 Sex education in biology teaching

AHL, A.S.
The Yam and the Pill
The American Biology Teacher, 40, 1978, No.1, pp.38-41
Lit. 7

The article briefly sums up the history of birth control and indicates the steps which have lead to the development of the birth control pill. This history begins with written testimony to birth control more than 5 000 years old. In those early stages, birth control was achieved by the introduction of mechanical barriere to sperm penetration. Later, substances which were lethal to spermatozoa began to be used. Contemporary methods are still based on the same principles. The author deals in greater detail with the development of birth control pills and the first research done in this field in the middle of the last century. Rapid development occured in the thirties of this century. In the forties, synthetic steroids were produced. Research concentrated on Mexico where the most suitable plant for this purpose was found in the yam (Dioscorea mexicana) which contains a high percentage of diogenin. In conclusion the author describes research leading to the pill and the significance of this discovery.

LR

AHRENDT, H.J.
Jugendliche und Kontrazeption (Youth and birth control)
Biologie in der Schule, 28, 1979, No.5, pp.210-219.
4 figs.

Sexual education is an element in Communist education. The family, school and society all contribute to its implemention. The author provides factual information, which can be used in biology teaching. He first describes hormonal birth control, which at present represents the most effective method. The effect of hormonal drugs is to suppress ovulation by various methods (through the hypothalamus and pituitary gland and the ovaries), or by influencing the endometrium or the mobility of the Fallopian tubes. The side effects of hormonal birth control media are slight and after a certain period of time they usually disappear altogether (headaches, nausea, gaining in weight, loss of libido, falling hair, etc.). The use of these pills has become so widespread that even pupils in the 9th and 10th class sometimes use them, but among young girls this is connected with some risk (suppression of body growth and menstrual disorders). Inter-uterine contraception is based on placing a device into uterus. Devices made in Czechoslovakia, called "Dana cor" and "Dana Super lux" are used, mostly by women who have already given birth to children. Among the other contraceptives available are condoms (which are best suited for young people), measuring basal temperature (the method does not provide certainty), the use of the rhythm method, which makes use of infertile days (among young girls also not foolproof) and the use of chemical media with a spermacidial effect (the author does not recommend their use), and possibly also coitus interruptus (which is quite unsuitable as a contraceptive method).

FH

BARMAN, C.R. - RUSCH, J.J.
Bioethics: A Rationale and a Model
The American Biology Teacher, 40, 1978, No.2, pp.85-90, 107. 2 tabs. 1 appendix, lit. 7

New discoveries in the area of biology in recent decades have brought with them new approaches to the ethics of this field. As an introduction, the authors cite some specific examples such as the use of contraceptives, mechanisms which control human behaviour, etc. Decision-making in this area takes place at several levels. Most important of all is the aspect of society as a whole. Cooperation between specialists from various fields is necessary including physicians, physicists, economists, lawyers, sociologists and others. The individual represents yet another level. In the authors' opinion, some type of "excercises" in moral and ethical decision-making should form a part of school teaching. They have drawn up a special course, which deals with these problems. Its aims and main ideas are described. On the basis of the experience they have gained in this area, the authors make various recommendations for teachers. They discuss in detail some problems which students must deal with. In conclusion they cite a list of various aids, including films, slides and a bibliography of literature.

RA

HILLEN, W.
Sexualerziehung - Aufgabenbereich von Schule und Elternhaus (Sexual education - its scope in school and family)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No. 6, pp. 161-162

The tasks of sexual education in the 5th and 6th classes cannot be dealt with by school alone, without the support of parents. This requires systematic cooperation between parents and school. The article describes how a teacher can activate his pupils' parents in this context, how his own method has been successful in practical application. A letter to parents is quoted, which acquaints them with the need for cooperation between parents and school in the area of sexual education and provides them with motivation for this cooperation. The author acquaints parents with the tasks of the biology syllabus used in the Saarland in this area: a young boy becomes a man, a young girl grows into a woman, intimate hygiene and daily care of the body, a man and a woman have a baby, pregnancy and delivery. The didactics of biology clearly stress the need for sexual education in schools, in spite of the fact that it does not form an independent subject but rather is a teaching principle in the biology course, in the teaching of the mother tongue, in the social sciences, in physical education and in art education; in the Federal Republic of Germany also in religion. The largest number of tasks belong to biology. The author acquaints the reader with the content of five basic topics for sexual education.

AA

McAULEY, J.A.

Sex Education in the Curriculum: Opposed

The American Biology Teacher, 40, 1978, No. 5, pp.311-312. 2 tabs.

A paper presented to the annual meeting of the National Association of Science Teachers which dealt with the problem of including sex education into the school curriculum. The author cites his own opinions on how to explain the fact that the number of unwanted pregnancies is increasing. He mentions the fact that in school, sex education is limited to general problems of reproduction and reproductive cycles. When teachers attempt to extend the information they give students beyond this, they usually encounter moral, social or religious obstacles. The role of parents in sexual education is stressed. The author considers the efectiveness of sexual education, and choses as a criterion of this effectiveness the incidence of veneral disease, illegitimate children born to persons under 20 years of age, etc. In tables he sums up these figures for the period 1940 to 1974.

RA

SMALLWOOD, W.L.

Sex Education: A Personal Opinion

The American Biology Teacher, 40, 1978, No.5, pp.312-313

The author cites the conclusions at which he has arrived on the basis of conversations with teachers over a number of years. He distinguishes three broad categories of sexual education and within the framework of each of these categories he distinguishes a number of problems. His first category includes general problems, such the concept of sexual reproduction, human reproductive biology, sexual differences in growth and development. The second category includes suggestions which are interesting for students, but which do not have a clear place in teaching, for instance contraceptive methods, the problem of sex in marriage, in vitro fertilization, etc. The third category includes so-called touchy problems, which are usually included into the area of pornography (erogenous zones, group sex, positions in coitus, homosexuality, frigidity, impotence and others).

RA

SIMPSON, R.D.
Sex Education in the Curriculum
The American Biology Teacher, 40, 1978, No.5, p. 309.

With increased progress also the knowledge which children should acquire in school changes. For many biology teachers the manner in which to deal with such problems as drugs, evolution and various aspects of sex are becoming a problem. The National Association of Science Teachers provides some help. At its annual meeting in 1976 this Association for instance discussed sexual education. It attempted to answer some questions, such as whether sexual education belongs into the framework of the natural or social sciences. Here the papers presented by three members of the Association are cited: the director of the Study Curriculum in Biological Sciences, the vice-president of Trans Texas Energy, Inc. and the author of a biology textbook for colleges.

RA

6.9.0 Vocational guidance education in biology teaching

ABDYUKHINA, V.A.
Tekhniki-tekhnologi pishchevoy promishlennosti
(Technicians and technology experts in the food processing industry)
Biologia v shkole, 53, 1979, No.2, pp.27-29.

The food processing industry in the USSR includes more than 40 different branches, which are to a great extent mechanised or automated. In the 10th five-year plan, output in the food processing industry will increase by 23-25 %. A necessary prerequisite of such production is the improved qualification of its personnel. The training of specialists for this field takes three and a half years (for graduates of eight-year basic schools), or two and a half years (for graduates of secondary schools). The pupils gain the qualification technology technician, mechanics technician, electromechanics technician, planning technician, accountant. The author describes in greater detail these specializations.

FH

BESKARAVAYNAYA, Z.G.
Yuniye timiryazevtsi iz goroda Ordzhonikidze (Young followers of Timiryazev from the city of Orzhonikidze)
Biologiya v shkole, 53, 1979, No. 2, pp. 67-68.

The author describes her own experiences with vocational guidance. The school in which she teaches has a vocational guidance center called "Orientir", where the pupils learn about the professions which are needed in their city. Meetings are held, where various people come for discussions, and excursions are organized. Also a number of hobby clubs are active in the school and the author describes their activities.

FH

BINDEL, H.J. Jr.

Finding Out More Amount Careers in Biology

The American Biology Teacher, 40, 1978, No.4, pp.248-250,256. 1 tab.

Before graduation from high school the student decides on whether to go to college or to a job. If biology is among his interests, he often does not know of job opportunities in this field after graduation from college. The author attempts to answer this question. First a definition of biology is given and its division into various fields is discussed. Some of the basic problems which teachers encounter in vocational guidance are discussed. A survey of sources from which it is possible to gain further information is given and a survey of available jobs.

RA

CARROLL, J.

Careers in the National Park Service

The American Biology Teacher, 40, 1978, No.3, pp.179-180, 190. 3 figs.

National Parks have in recent years provided a number of new job opportunities for biologists. The author in the introduction to the article acquaints the reader with the status and activities of the National Park Administration. For various types of jobs he cites briefly the demands made upon the candidate and the type of work he will do. He especially discusses the work of rangers, who also work as guides. In 1970 a laboratory for ecological services was openned by the National Park Administration. In the article the author describes job and career outlooks in this field.

RA

DAVIS, C.A. - REDDEN, M.R.
Achievement in Biology: An Introduction to Handicapped Biologists
The American Biology Teacher, 40, 1978, No.3, pp.175-178, 190, 3 figs., lit. 4.

On the basis of the example of three specific persons, the authors wish to demonstrate that in the case of the handicapped there are hidden reserves of talent and skills in biology. The first is dr. J.Gavin, the director of the International Alergy Research Project. After doses of dihydrostreptomycins he lost his hearing. The second is Dr. P. Stearn, a member of the research staff at the Argonne National Laboratories, who was born with spinal paralysis. Finally, the article deals with Dr. Vermeij, who became blind as a child. He is now a professor of biology at the University of Maryland and is a specialist in the study of molluscs.

HA

GOLDSCHMIDT, M.C. - WHITT, D.
Careers in Microbiology ... Horizons Unlimited
The American Biology Teacher, 40, 1978, No.4, pp.205-211, 222. 11 figs, lit. 6.

The authors acquaint the reader with job opportunities in microbiology. After a general introduction devoted to the importance of microbiology in contemporary science, they devote their attention to various areas in which microbiology is important. These include medical and clinical microbiology, immunology, veterinary microbiology, public health and environmental control, microbial physiology and bio-chemistry, microbial genetics, virology, mycology, protozoology, agricultural microbiology, industrial microbiology, the microbiology of food processing, of water, of space and microbiological paleonthology. The article also cites the demands which such a broad utilization of the subject places on teaching in schools. The article includes photographs which document the activities of a microbiologist and also show some interesting objects of microbiological research.

RA

HATCH, T.D. - KADISH, J.
The Biology Student Today - Health Professional Tomorrow
The American Biology Teacher, 40, 1978, No.4, pp.217-222. 6 figs., lit. 16.

Today biology students represent a source of personnel for health services. In the United States there exist a total of 200 various types of jobs in health care where biologists can work. Some of them are described in greater detail. The authors go on to discuss in general terms the necessity of a biological education for those working in health care, and the best way of training for work in this field. The following professions are described in greater detail: medical laboratory technician, respiration therapy technician, etc. The article also discusses public health problems, such as a lack of qualified personnel in rural areas. The government attempts to solve these problems by providing such people with various advantages. Teachers have an important task in this context. In conclusion some aspects of a teacher's activities are described which aim at vocational guidance towards biology and medicine.

RA

HEYNEMAN, S.P.
Adolescence Obligations and Educational Policy
The American Biology Teacher, 40, 1978, No.7, pp.423-425, 432.

The author discusses the fact that during this century great progress has been achieved in extending human rights to adolescents. This of course influences social policy in general. In the area of education this means that young people can freely decide for what profession they wish to train. Within the framework of social policy directed at youth, the author distinguishes two different categories: the first includes such activities or the excercise of rights of adolescents where they themselves can make the relevant decision; the second category includes their obligations. Educational policy usually concerns only the first category. The author briefly sums up the tasks of school and family education and discusses the second category of educational policy problems.

RA

HUMES, A.G.
Marine Biology as a Career
The American Biology Teacher, 40, 1978, No.3, pp.152-155, 4 figs., lit. 8

The author describes the career opportunities of biologists in the marine economy. First he provides a brief outline of the uses to which mankind has put the seas since the beginnings of human civilization. He defines three main areas of biologists' interest in the sea - plankton, nekton and benthos. He describes the subject matter of marine biology and the training of specialists in this area. Also a survey of the fields of study a future marine biologist must learn is provided. Then jobs are discussed in detail. The activities of marine zoologists, algaeogists, ecologists, physiologists, bio-chemists and bacteriologists are described. Mention is also made of the work done by marine biologists in the fishing industry and the marine economy. Information is also provided on some of the specific aspects of the life of a marine biologists and some of the characteristics which a person must have for this profession.

RA

JOHNSON, G.A.
Career Education in Biology
The American Biology Teacher, 40, 1978, No.4, pp.242-246. 3 figs., 2 tabs., lit. 15.

Previously the choice of a career was mostly left to chance. Today often school curricula include education in the area of vocational guidance. The author describes his experiences in this field, as far as biology teaching is concerned. He describes in detail various opportunities for vocational guidance activities. The basic assumption for this type of work is a thorough knowledge of each student, his characteristics and life. In view of the fact that the majority of students are undecided as to what they will do after graduation, three methods have been suggested on how to help them become aware of their interests and talents. The COP (California Occupation Preference System) method has been used, which is briefly described in the article. The ASVAB - program used for colleges was chosen as a testing method. A table sums up its various items. In conclusion some findings are summed up for teachers.

RA

KASTRINOS, W.

Factors to Consider in Choosing a Health Profession

The American Biology Teacher, 40, 1978, No.4, pp.224-227, 235.

When deciding upon a career in health, students usually take only some factors into consideration, which influence this choice. These include the increasing demands made upon acceptance to some training programs, the increasing influence of the government in the remuneration of health care staff, the increasingly used system of team work, etc. The author deals in detail with these factors. For some years now there has been an increasing interest in acceptance to medical and stomatology schools and thus also increasing competition for acceptance. But in recent years also an interest has been growing in various other professional institutions. The government, both at the Federal and state level, always to a certain extent influences the health care professions, and their status and influence have been growing in recent years. Two new trends are in evidence in health care: the increasing influence of other related fields outside medicine proper and team methods of work. The author also discusses the personal traits a person should have for chosing this profession and provides an informative survey of the professional institutions which can give further information.

HL

LAMB, D.A. - SHAW, M.W.
Careers in Medical Genetics
The American Biology Teacher, 40, 1978, No.4, pp.212-216, 223. 1 fig., lit. 12.

The article acquaints the reader with career opportunities in the field of medical genetics. Besides basic research, also the population is studied, as well as modern inter-disciplinary fields which are connected with legal aspects, industry or the social sciences. The authors first acquaint the reader briefly with the development of genetic research and its relation to other scientific disciplines such as bio-chemistry, the social sciences, etc. Also detailed discussions are developed on the problem of job opportunities for those who major in genetics: in medical research, in population studies, in evolutionary studies, in clinical practice and in laboratories. In conclusion a brief survey of the role of the National Health Institute and its activities is given.

RA

LAUGHLIN, C.W. - MANG, L.L. - LaPRAD, R.G.
Agricultural Roots in the Biological Sciences
The American Biology Teacher, 40, 1978, No.4, pp.231-235. 9 figs., lit. 1.

The article points to the fact that agriculture makes use of biological knowledge and also that provided by physics. Agriculturalists can be experts in biology, zoology, in commercial areas or other professions. The authors discuss in greater detail some aspects of specializations in botany and zoology. All fields of study connected with fauna are highly sought after, because they provide the key to increased food production from all types of farm animals, poultry and fish. Botanists will find careers in crop management, forestry and plant pathology. Increased crops are a primary interest of agriculture, but care of the forests is also very important. In conclusion the authors formulate educational aims, which teachers should take into account. The article is accompanied by documentary photographs.

RA

SMITH, E.H.

Entomologists at Work

The American Biology Teacher, 40, 1978, No.4, pp.237-246. 6 figs., lit. 1.

People become entomologists for two reasons. The first is a yearning to learn about nature, to observe it and understand it, while the second is a attempt to gain control over insects. The author in the article describes various jobs which entomologists do in various areas. He sums up basic assumptions for the study of this discipline and provides a survey of the work entomologists do at colleges and universities, in research, in agriculture, in medicine and veterinary medicine, in government institutions, industry, in the inspection of pestacides and in education. The article is accompanied by a number of photographs, which document the practical uses of entomology.

RA

STRAUSS, M.J.B.

Wanted: More Women in Science

The American Biology Teacher, 40, 1978, No.3, pp.181-185, 188. 1 tab., lit. 22.

The article sums up the existing barriers to greater numbers of women finding careers in science and suggests some methods of overcoming these barriers. According to statistical data for 1974, out of almost two million research workers in science only 9,4 % were women. And of this number an even small share were permanent research workers in the natural sciences. The author provides a survey of job opportunities in the natural sciences open to women. A research project has indicated that there are four main obstacles to women's careers in the natural sciences: different methods of bringing up boys and girls, the dislike that girls have towards the mathematical sciences, the opinion that the most important age in a scientific career is before 35 years and discrimination against women in seeking jobs. The relative share of women found in areas where those with a degree in the natural sciences can find jobs are analysed.

RA

WHEELER, M.

Technologists and Technicians in the Life Sciences

The American Biology Teacher, 40, 1978, No.4, pp.228-230.

The article deals with the opportunities provided by a technical education to those who are interested in biology and who do not intend to continue their study at a university. The author provides a survey of fields where such people can find good careers. In agriculture these include the job of agricultural technician who specializes in crop management, environmental conservation, food technologies, forestry or animal husbandry. Another area are biology technicians working in various types of laboratories or marine technologists, working either in oceanography or marine industries. The need for medical technicians is very great. These include those who work in laboratories, with electrical encephalographs and cardiographs, doctor's assistants, radiologists, optometrical assistants, or those who service various instruments in surgery. In conclusion data on other sources of information are cited.

RA

WRIGHT, G.

Jobs for Life Scientists in Larger Museums

The American Biology Teacher, 40, 1978, No.3, pp.166-171. 15 figs., lit. 5.

The article provides a survey of opportunities for careers in museums for natural science graduates. In the introduction, the author considers the present situation as far as jobs for science graduates are concerned. There are too few, but museums still provide some opportunities. The author comes to the conclusion that in recent years the number of museums has increased. In order to provide information on various jobs provided by museums he chose the example of the National Museum of Natural Sciences and acquaints readers with its structure. The museum has a department for the zoology of vertebrates (with mammological, ornithological and ichtyological sections) and a department for the zoology of invertebrates (with sections for the study of crustaceans, mollusks and worms), an entomology department and a botanical department, which also has several sections. Brief characteristics of the activities of these departments and sections are provided.

The author also acquaints the reader in greater detail with the activities of a curator. In conclusion he discusses in general terms the work done by museums.

RA

NEFEDOVA, A.I.
Tekhniki-tekhnologi myasnoy i molochnov promishlennosti (Technicians and technologists in the dairy and meat packing industries)
Biologiya v shkole, 53, 1979, No. 3, pp. 23-24.

For fulfilling all the tasks which the dairy and meat packing industries have, the qualification of its personnel must be improved. Their education is supervised by 20 technical schools of the Ministry of Dairy and Meat Packing Industry of the USSR. These schools are well equipped and provide courses in 9 specialisations. The schools accept graduates from the 8th or 10th classes, the course lasts for three and a half years, or two and a half years. The author descibes in greater detail some of the aspects of various specializations and training at these schools.

FH

6.9.3 Defence education in biology teaching

PROŠEK, J.
Uplatnění prvků branné výchovy ve výuce přírodopisu na základní škole (The implementation of elements of defense education in teaching the natural sciences in basic school)
Přírodní vědy ve škole, 30, 1978/79, No.5, pp.170-171.

In the new concept of the teaching and educational system, defense education will no longer be an independent teaching subject in basic schools, but its content will be included into the syllabi of other teaching subjects. Among them, the natural sciences will have an important role to play. The most important part of defense education concerns the topic of the human body; it includes theoretical, practical and ideological aspects. The article describes in detail which elements of defense education should be included into which topics in the biology syllabus.

vČ

7. The content of biology teaching

PLINTNER, A.

Plädoyer für den menschenwürdigen Umgang mit der jungen Generation (A defense of humane and respectful dealing with the young generation)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 5, p. 134

The author quotes the journal Die Zeit (No.45 from October 10th, 1978) which criticises schools for being too slow with the reform of the curriculum being prepared, while at the same time attempting to make teaching too scientific; within the framework of modernization the schools try to teach modern science in every teaching subject. What should be taught at institutions of higher learning is now being taught in secondary schools. The minds of pupils are being filled with knowledge which is adequate only for the process of study, but far distant from every day life. Science should not be the self-fulfilling purpose of secondary school. It is not correct for linguistics to replace the mother tongue or music theory to replace music. Secondary school pupils have to learn an artificial and nonsensical terminology in the form of what are rather scientific instructions instead of teaching concepts. The syllabi of all teaching subjects combined are so scientific that 90 % of all academics would today fail at examinations. What is taught remains without any connection to human experience.

AA

GANEV, P.

Tseli, zadachi i sdrzhanie na obuchenieto po biologiya v VII. klas (The aims, tasks and content of biology teaching in the VIIth class)

Biologiya i khimiya, 22, 1979, No. 4, pp. 14-16

The syllabus on vertebrates and on the eco-system in the 7th class continues in the syllabus on invertebrates taught in the 6th class.

The aim of biology teaching in this class, besides learning the relevant physiological, anatomical and ecological knowledge, is also to develop the thinking of pupils and to teach them the ability to do independent, methodologically correct work and also to strengthen polytechnical principles.

The tasks of biology in the 7th class are the following:

1. to derive common characteristics in the structure, physiology and ecology of vertebrates;
2. to use comparative methods in studying the degree of their development and adaptation to the conditions of life;
3. to point to evolutionary trends from an aquatic environment to terrestial forms;
4. to point out the phylogenic relations which exist between groups of vertebrates;
5. to point out the economic importance of groups of vertebrates and to strengthen polytechnical elements in teaching.

As far as the content of biology teaching in the VIIth class is concerned, the author analyses individual topics and defines basic notions and terms, which the pupils should learn. At the same time he stresses the significance of the correct assessment of the pupils' knowledge and of strengthening what they have learnt.

LR

7.1.5 The historical method in biology teaching

DRANSFELD, K.
Zusammenhänge zwischen Bevölkerungsentwicklung und gesellschaftlicher Entwicklung (The mutual relation between the development of the population and social development)
Biologie in der Schule, 28, 1979, No. 9, pp. 374-378.
1 tab.

The importance of historical facts in biology teaching are often underestimated. For this reason the author cites various facts concerning infant mortality, which are closely connected with social developments. These facts can be used when teaching human biology or explaining the importance of biology as a subject. At present there are 1.4 billion children throughout the world, of which 80 000 go hungry every day. 350 million children do not have sufficient food or medical care. The author also cites data on the decrease in infant mortality in the German Democratic Republic and analyses the relation of infant mortality, life expectancy and the normal length of human life. In conclusion he discusses the development of the population (in 1989 there will be 5 billion people on Earth), since the times of Malthus until the present.

FH

7.2 Selection of leading ideas for biology teaching and differentiation between primary and secondary teaching material, the question of essential subject-matter.

SKOOG, G.
Does Creationism Belong in the Biology Curriculum ?
The American Biology Teacher, 40, 1978, No. 1, pp.23-26, 29, lit. 16.

The author discusses the problem of anti-evolutionary and creationist ideas in the context of biology teaching. He first turns to history, to the time when Darwin´s "On the Origin of the Species" was published. Criticism of the theory began immediately after its publication and culminated in the twenties of the XXth century. Up to the sixties, evolutionary theory was taught insufficiently. The article deals in greater detail with the problem of the period in which evolution was "legalize" in the textbooks. The resistence to evolutionary theory did not, however, disappear; especially in the state of Tennessee it was very strong. Some of the authors who participated in this contraversy are quoted. The author comes to the conclusion that the reason why it took so long for evolutionary theory to be generally accepted are psychological, sociological and also religious. Any attempt to introduce creationism into the syllabus today would also be the outcome of psychological or political reasons, rather than biological ones.

RA

7.6 Curricula and syllabi in biology

WERNER, H.
Curriculumforschung und Schulalltag. Teil II.
(A study of the curriculum and the everyday life of school)
Praxis der Naturwissenschaften-Biologie im Unterricht der Schulen, 28, 1979, No. 4, pp. 103-107.

Together with the introduction of a new curriculum also the training of teachers for their careers should be re-considered. Especially vocational guidance towards the teaching professions should improve. The new content of billogy teaching places increased demands upon the work of a teacher, his professional and didactical training. The status of teachers within society should be newly defined and also the importance of biology for society as a whole reconsidered. This is apparent when we take into account the greater role of ecology in teaching. However, the new structure of biology teaching should first be practically verified.

AA

BINAS, A.V.
Zamecha-niya i predlozheniya k proyektu programmi
(Comments and suggestion on the draft of the syllabus)
Biologiya v shkole, 53, 1979, No. 2, pp.40-41

The basic specific aspect of the draft of the new syllabus is a trend towards a reduction of its content. For instance the syllabus for botany is so reduced, that any further reductions would be very difficult. In order to leave out complex secondary information, it is necessary to first determine the volume and depth of knowledge and content of various concepts which pupils should learn. The draft of the new syllabus also limits the number of laboratory experiments, which is a positive aspect.

FG

BOGOYAVIENSKAYA, A.E. et al.
Nekotoriye zamechaniya k proyektu programmi
(Comments on the draft of the syllabus)
Biologiya v shkole, 53, 1979, No. 1, pp. 36-37

In the opinion of the authors of the draft syllabus, it is fully in accord with the contemporary state of the science and the logic of developing its concepts. The authors also devote attention to the educational role of the teaching lesson, the nature conservation aspect and take the basic principles of didactics into account. Nevertheless, they suggest several changes as far as laboratory work and demonstrations are concerned, as well as phenological observations, homework, excursions and work during the summer holidays. These comments concern the sections of the syllabus on botany, zoology, human biology and general biology.

FH

CARTER, M.A.
A View from the Top: Elementary Science and the Three R´s
The American Biology Teacher, 40, 1978, No.3, pp.143-147, 163, Lit. 6

The author in this article deals with the problem of incorporating science lessons into the timetable. Usually the three R´s have priority. Often when a science lesson finally arrives, both children and teacher are tired. The importance of elementary science is often underestimated. The author cites the educational contribution which science teaching makes. Science helps to satisfy the children's curiosity, teaches them to think critically and helps them to form skills in dealing with problems. From this point of view science and the three R's are no longer unequal, but rather supplement each other. The article contains various suggestions for class work, which especially well contributes to learning in the above sense of the word.

RA

TSUZMER, A.M.
Zamechaniya k proyektu programmi (Comments of the draft of the syllabus)
Biologiya v shkole, 53, 1979, No.2, pp.33-36

The draft of the new syllabus differs from the one now in use. There are many positive new traits, but also some negative aspects. For instance the section on "inter-disciplinary relations" is not in accord with its title. The author also brings critical comments on the botany, zoology, physiology and human hygiene sections, as well as on the general biology section.

FH

DIETRICH, G.
Zum Biologieunterricht in der Klasse 7 (On biology teaching in the 7th class)
Biologie in der Schule, 28, 1979, No.10, pp.430-432.

Since the school year 1978/79 the syllabus for biology teaching in the 7th class begins with the topic "Cellular Theory", since the topic "An Introduction to Microscopy" has been transfered to the 6th class. This has freed three teaching lessons, which can be devoted to the topic "Bacteria". The author explains these changes in the syllabus and cites methodological comments also concerning other topics taught in the 7th class.

FH

FRASER, B.J.

Measuring Learning Environment in Individualized Junior High School Classrooms

Science Education, 62, 1978, No.1, pp.125-132. 2 tabs.

The article stresses the point that when a school curriculum is being updated, the conditions of teaching in class must be taken into account. In the first part of the article the author cites the opinions of some of those who have written on this subject. Walberg's draft of an inventory of teaching conditions is discussed; under certain conditions this inventory is not suitable. Its development, theoretical foundation and possible modifications are described. In the author's opinion new methods of measurement are needed to differentiate traditional and innovative teaching methods. This is summed up into 9 environmental conditions needed for individualized junior high school science classrooms.

RA

GREEN, M.R.

Learning Theory Applied to Biology Education

The American Biology Teacher, 40, 1978, No.5, pp.268-271. Lit. 8

New trends are appearing in biology curricula. While in the sixties the syllabus concerned mostly the teaching subject itself, at present the students and their ability to learn are in the forefront. The article deals with the implementation of some learning theories and biology education. The work of Jean

Piaget is crucial in this context. The author briefly characterizes his theory, according to which a child's intelligence develops in the direction of logical thinking. She poses the question, at what age children are capable of formal deductions. Drafts of such formal operations which should be included into the syllabus are formulated by the author. Pupils are, for instance, asked to determine whether a claim is in the nature of a fact or a generalization. They learn to formulate a hypothesis, carry out an analysis and attempt to prove the hypothesis. The author also deals with the problem of overcoming the difference between new facts learnt from the student's environment and his relation towards this environment. She also briefly mentions the process of transmitting information. In conclusion she formulates some of the consequences which follow from this for the teacher.

RA

Hinweise zur Arbeit mit den überarbeiteten Lehrplänen der Abiturstufe (Comments on work with changed curricula used in general education secondary schools) Biologie in der Schule, 28, 1979, No. 7-8, pp.273-281

On September 1st the 11th classes of general education secondary schools will receive a changed curriculum. A year later the curriculum for the 12th classes will also undergo changes. At the same time documents are being prepared for school councils and the principals of schools, which stress the essential new aspects of the curriculum. The present article is based on this material. First pedagogical aspects are explained in the changes which have been introduced into the curriculum and then biology teaching is discussed in greater detail. The aims and tasks of biology teaching are analysed, as well as the structure of the curriculum. In conclusion, notes are provided on various parts of the syllabus (systematics, ecology, physiology, genetics). In comparison to the syllabus introduced in 1972, more independent work by pupils is stressed, as well as their activity and the educational aspects of the syllabus.

FH

KHALOVA, A.I.
O proyekte programmi po biologii (On the draft of the biology syllabus)
Biologiya v shkole, 53, 1979, No.2, pp. 39-40.

Teachers approve of the draft for a new biology syllabus. The stressing of ecological aspects and those of nature conservation contribute to the education of a scientific world outlook among pupils and their cultivated behaviour when outdoors. However, the deletion of some theoretical sections of the syllabus may lead to a gap in the continuity and sequence of understanding some biological notions; the author documents this on the basis of specific examples. Some topics should be taught in a better organized manner.

FH

Itogi obsuzhdeniya proyekta programmi po biologi
(Some conclusions concerning the assessment of a draft for a new biology syllabus)
Biologiya v shkole, 53, 1979, No. 3, pp.30-34

The article sums up the discussion which has taken place in several issues of the journal and expressed the opinions of various specialists concerning the draft of a new syllabus for biology teaching (published in issue No.4/1978). A number of comments were received from various republics of the Soviet Union, from teachers, scientists and administrators. The most important opinions expressed are the subject of comments by the editors of the journal.

FH

LEVENKO, B.A. et al.
Nekotoriye zamichaniya po proyektu programmi (Some comments on the draft of a new syllabus)
Biologiya v shkole, 53, 1979, No.2, pp.41-44

Biology teaching should be improved. The basic drawback of the existing syllabus and textbooks is a lack of logical mutual relations, which means that the subject-matter is disintegrated into individual topics. A comparison of the botany syllabus with the one used 20 years ago shows that no important changes have taken place in the structure of the course and this is also true of the textbook. The situation is somewhat better in zoology, even if the draft of the new syllabus is also based on the old tradition. The syllabus for general biology is lacking in logical links and relations between its individual parts.

FH

MAGOMETOV, A. - ALIMIRZAYEV, G.
Neobkhodima dalneyshaya razgruzka (Further reductions are a necessity)
Biologiya v shkole, 53, 1979, No. 2, pp.38-39

The authors criticise the fact that the draft of the new syllabus is overfilled with non-essential subject matter, redundant facts, etc. This is especially true of the section on general biology. Many topics are too complex for the understanding of pupils and will not provoke their interest. The examples cited include "Stages in the energy metabolism", "The development and maturing of gamets", "Mitosis", "Parthenogenesis", "Genetics of the population", etc.

FH

McNARNEY, H.
What Direction(s) Elementary School Science?
Science Education, 62, 1978, No.1, pp.31-38

During the last 10-15 years there has been an increased interest in the elementary school curriculum and its development. The first round of intensive development of curricula took place in the sixties, while a second round of this development can be seen in the last 4-5 years. The author does not attempt to predict future trends in general, but rather clarifies some possible trends in science teaching in elementary school. In his opinion the future of science in elementary school is influenced by the opinions of teachers concerning the division of various sections of the course throughout the curriculum. Also basic components of education are discussed, as well as various opinions on this subject and various types of curricula. In this context individual teaching, learning skills, stressing independence, the K-12 program and its structure, etc. are discussed. In conclusion various problems are summed up, which still await their solution.

RA

MYAGKOVA, A.N.
Metodicheskiye rekomendatsii k izucheniyu kursa obshchey biologii v svyazi s korrektivami programmi
(Methodological recommendations for teaching the course on general biology in connection with changes in the curriculum.)
Biologiya v shkole, 53, 1979, No.4, pp.26-29, 2 tabs.

An analysis of the general biology syllabus has shown that corrections can be introducted without decreasing the educational function of the course. In the topic "Darwinism" certain changes can be carried out (for instance the journey Darwin made on the ship Beagle can be given as an independent project prepared on the basis of reading). The topic "Artificial selection and its role in forming pigeon breeds" is so simple that it can be mentioned only marginally. In a similar vein the author analyses and suggests changes in other topics, including "The origins of man" and "An organism and its environment".

FH

MOHN, E.
Stellungnahme zum Bericht "Darf Billogieunterricht gekürzt werden ?" von Gerhard Trommer in NiU-Biologie Heft 4/1979 (A stand concerning the report "Can biology teaching be made more brief ?" by Gerhard Trommer in NiU-Biologie, 4/1979)
Naturwissenschaften, 27, 1979, No. 6, p. 184

The teacher training students from a pedagogical seminar at Donauschingen have learnt that in Baden-Wirtenberg a reduction of biology teaching is being prepared for teachical general education secondary schools. In their protest, the students stress the importance of contemporary biology, the danger which is posed by loss of biological equilibrium (in the ecology of the environment), as well as problems concerning human perception, the nervous system, human behaviour, reproduction and the development of man, basal metabolism, health hazards, circulatory disease, cancer, stress, alcohol and its consumption, drugs, nicotine, heredity and evolution. This is only a brief list of topics which every person should know something about. The future teachers also protest against deleting biology from the list of elective subjects (one out of four) for the school leaving examination. 20-30 % of pupils in past years have chosen biology as a basic subject for the examination and 50 % of them as one of the elective subjects for the examination.

AA

NIKISHOV, A.I.
Usilit vospitateliniye funktsii kursa zoologii
(Strengthening the educational function of the zoology course)
Biologiya v shkole, 53, 1979, No. 3, pp.25-27.

This article is one of a series which express opinions concerning the draft of a new syllabus. The new draft for the zoology syllabus is essentially only a shortened version of the existing syllabus. Its positive aspect is the inclusion of interdisciplinary links. The author agrees with the fact that the new syllabus is briefer, but in his opinion non-essential material has not been deleted entirely. Making the sections on anatomy and morphology briefer requires a change in their structures, as well as that of the textbook. Some problems, especially evolution, ecology, nature conservation and polytechnical aspects should be reinforced.

FH

O korrektivakh k uchebnim programmam obshcheobrazovatelnikh shkol na 1979/80 uchebniy god. (Changes in the curriculum of general education schools for the school year 1979-80).
Biologiya v shkole, 53, 1979, No. 4, p. 25.

In accord with the resolution of the Central Committee of the Communist Party of the Soviet Union and the Council of Ministers of the USSR from October 22, 1977, the Ministry of Education is now carrying out a reduction in the teaching curriculum. Changes which are being introduced are part of the steps being taken to overcome the overloading of pupils. In the general biology syllabus for the 9th and 10th classes changes are being carried out in the topic "Darwinism", "The role of artificial selection in developing new breeds of pigeons", "The origins of man" and "The organism and its environment".

FH

PATRUSHEVA, O.I.
K obsuzhdeniyu proyekta programmi (On assessing the draft of the new syllabus)
Biologiya v shkole, 53, No. 2, pp. 36-38

Four committees were formed for the purpose of assessing the draft of the new syllabus; they were chaired by experts in general didactics and by experienced teachers. The author documents the outcome of the work of the committees on the basis of the example of the topics "The cell", "The seed" and "The leaf", as well as on the syllabi for zoology, anatomy, physiology, human hygiene and general biology.

FH

RENNER, J.W. - GRANT, R.M. - SUTHERLAND, J.
Content and Concrete Thought
Science Education, 62, 1978, No. 2, pp. 215-221, 1 tab.

In planning the new syllabus three factors should be kept in mind: what the basic aim of the syllabus is, how the structure of the given scientific discipline can be used for this purpose and what the children are capable of learning. The authors analyse all three factors in detail. The definition of aims of the syllabus has been taken from documents prepared by the Commission for Teaching Methodology from 1961. Also a definition of learning and a definition of thought are provided. The theoretical foundation of the article is in the work of J. Piaget. The Center for Natural Science Education at the University of Oklahoma has carried out a research project on this basis, which concerned the question of the extent to which formal though is developed in school children.

RA

TAMIR, P. - KEMPA, R.F.

Cognitive Preference Styles Across Three Science Disciplines

Science Education, 62, 1978, No. 2, pp. 143-152, 6 tabs.

One of the important aspects of the new science education curriculum is the increasing stress placed on the forming of notions, scientific principles, research methods, critical thought, etc. The approach of the teacher to these aims can determine and guide the thinking of students and also influence their cognition. The article considers the causes of the situation where one and the same student develops preferences for similar or differing cognitive styles in different science disciplines. The authors compare three teaching subjects - physics, chemistry and biology. In a project described by the author, testing methods developed by Heath were used. Each test contained 20 items. The findings are summed up in a table, accompanied by detailed explanations.

RA

7.8 The comparative study of curricula in the socialist countries and foremost capitalist countries, positive and negative features of these curricula.

WERNER, H.
Curriculumforschung und Schulalltag. (Einige Anmerkungen aus dem Blickwinkel der Fachdidaktik Biologie)
(A research project concerning the curriculum and the every-day life of school. (Some comments from the point of view of special didactics of biology))
Praxis der Naturwissenschaften-Biologie im Unterricht der Schulen, 28, 1979, No. 3, pp. 57-61, 2 figs.

In the Federal Republic of Germany a draft for a new biology curriculum has been under preparation for 7 years. The impuls for changes in the curriculum was provided by new curricula used in the USA in the sixties. In the Federal Republic the new curriculum is being prepared by the Institute of Pedagogical Sciences, which has been organizing discussions in various journals concerning the content, methods and aids used in teaching. The concept of an open curriculum has led to some confusion among teachers. Disagreement exists between those who are specialists in biology and those who are specialists in the didactics of biology. The aim of the changes are not innovations in the field of biology, but rather innovations in teaching methods, practical school needs and the activities of teachers. Their purpose is to increase the efficiency of teaching, while at the same time increasing the pupils' activity. Also the training of teachers has been a subject of criticism. In a scale of 1 to 6, 26 % of respondents assessed the existing system of teacher training by 1 - 3, and 49 % by 4 - 6. The fact that university teachers stress professional erudition and scientific innovation, regardless of the needs or actual possibilities of pupils and school, was subject to criticism. In preparing the new curriculum and textbook, close cooperation between biologists and those who specialise in didactics is needed. Biology teaching is a multi-factor field with specific suitable strategies and teaching methodologies. In the course of teaching, suitable complex cognitive structures should be formed.

AA

8.21 The regional approach

BAKHRIDINOV, N.B.
Krayevedecheskaya rabota shkolnikov (Regional work done by pupils)
Biologiya v shkole, 52, 1979, No. 1, pp. 63-65.

The students of the Pedagogical Institute at Dushanbe have for several years been studying the vertical stratification of wild fruit trees. They have found that the most frequently found are crab apples which grow up to altitudes of 3 040 metres. Also the Persian walnut tree can be found at high altitudes (up to 2 860 m). Pomegranate trees can be found up to 1 870 and the ficus trees up to 1 600 meters altitude.

FH

GALYAMOVA, A.A.

Izpolzovaniye krayevedecheskogo materiala v tselyakh ideyno-politicheskogo i ekonomicheskogo vospitaniya uchashchikhsya (The utilization of regional elements in the ideological, political and economic education of pupils)

Biologiya v shkole, 53, 1979, No. 6, pp. 22-25.

In education it is important to acquaint pupils with scientific and technological progress, with the penetration of the findings of science and technology into the national economy and with the prerequisites for improving the efficiency and quality of production. A number of opportunities for this exist in the biology syllabus, but the regional approach should always be taken into account. This leads to the activation of pupils and makes their knowledge more specific. The use of regional elements is documented by the author on the example of topics from general biology, such as "Variability and heredity", "The organism and its environment", "Photosynthesis" and "The selection of plants, animals and micro-organisms".

PH

YERSHOV, V.L.

Opit izucheniya trofyano-bolotnikh pochv (Experiences with the study of peat soils)

Biologiya v shkole, 53, 1979, No. 3, pp.62-67.

Among the resolutions of the plenary meeting of the Central Committee of the Communist Party of the Soviet Union is also one concerning land reclamation. In the Belorussian Soviet Socialist Republic this work has been going on for a long time. In the school where the author of the article teaches, pupils are acquainted with the specific aspects of soil types in the region and the importance of land reclamation work (this is done in lessons on biology, natural sciences and geography). One such specific aspect of the region are peat soils, which are found in layers of 50 - 60 cm under the surface. These soils have a high acid content (pH -2.5 - 3.6) and a low mineral content. The author describes how in the biology course various problems of these soils are discussed from the 4th class onward (not only in class work, but also in other organizational forms of teaching - during excursions and in hobby club work). In practical excercises pupils for instance study the botanical composition of peat.

FH

KAMBAROV, A.K. - SIMONSAN, O.P.
Otbor mestnikh rasteniy dlya ispozovaniya na urokakh botaniki (The selection of local plants for use in botany teaching)
Biologiya v shkole, 53, 1979, No.5, pp. 37-38.

One of the forms of increasing the efficiency of teaching is to stress the regional principle. For the needs of botany teaching in the Armenian SSR, the authors have selected a total of 120 species of plants. They chose such plants which are widely found, which are typical for the taxon to which they belong and which are of practical importance. On the basis of specific examples the authors demonstrate the opportunities which such plants provide for biology teaching.

FH

MROWCA, C.
Moje doświadczenia w wykorzystaniu otoczenia szkoły w nauczaniu biologii (My experiences with utilizing the vicinity of the school in biology teaching)
Biologia w szkole, 32, 1979, No. 1, pp. 23-26,
1 fig., 2 tabs.

The author describes the theoretical and practical opportunities provided by the immediate vicinity of the school, which is found in Timbark, for biology teaching. It provides opportunities for implementing the didactical principle of ostensive education, for developing the observational abilities of pupils and their independent work, for introducing them to the methodology of the scientific study of natural phenomena and for forming a suitable climate for developing the interests of pupils in natural artefacts studies. Also opportunities are described for gathering various biology material used in excercises, for cultivating plants or animals, combining theory and practical activities, for the operational utilization of scientific findings in typical situations, as well as in situations which are exceptional and for demonstrating the damaging effect of man on the environment. In Timbark the author makes use of mixed and coniferous forests, the local dairy plant, the local bakery, fruit orchard, vegetable gardening enterprise, water treatment plant, the local clinic, fields, an asphalt factory and of two rivers (the Lososina and the Czarna). The author describes an excursion for the 5th class and one for the 8th class. The material obtained during the excursion was later used for participation in the biological Olympiad.

The vicinity of the school represents a suitable means for implementing practical biological teaching and training; without it, the teacher could not implement the tasks formulated in the syllabus and organise practical excercises.

AA

SOCHA, H.

Jak korzystam z najbliższego otoczenia szkoły w nauczaniu biologii (How I utilize the close vicinity of the school for biology teaching)

Biologia w szkole, 32, 1979, No. 1, pp. 20-23, 1 fig.

The author describes how he makes use of the immediate vicinity of the school for biology teaching at a basic school in Śrem. He especially uses the greenery in the park, local industrial plants, a vegetable gardening enterprise, the flora and fauna found in the local lake and the garden belonging to the school. The pupils participate in the planting of greenery in the town, learn how trees are planted, as well as decorative plants; they learn about methods used for their reproduction and the functions of the natural barrier formed by a park which surrounds a local industrial plant. The pupils have pledged to take care of the town's park. The author describes an excursion to the local industrial plant which is a foundry, where he discussed problems of work hygiene and work safety. The pupils also often visit the vegetable gardening enterprise. The author provides a survey of topics which can be learnt there. During excursions to the lake, the pupils observe the life of plants and animals. In conclusion the author again stresses the advantages of using the vicinity of the school in the course of teaching.

AA

WALICKA, T.
Wykorzystanie lokalnych warunków środowiska w procesie nauczenia biologii (The utilization of local conditions in the environment in the course of biology teaching)
Biologia w szkole, 32, 1979, No.1, pp.26-30, 2 photos.

The author discusses the use of excursions into the immediate vicinity of her school in Parozew for furthering environmental education and other educational aims. The biology syllabus assumes excursions to a field, a fish-pond and to a forest. The author also organises excursions to a meadow and an orchard. During excursions pupils study abiotic factors in the environment, the influence of the bioncenosis upon the environment, they repeat what they know about plant morphology, they identify plants and animals, their characteristics, food chains, the economic importance of the biocenosis and discuss problems of nature conservation. During excursions, pupils work in groups of four or five. Another excursion concerns the coexistance and adaptation of fauna to life in the fish-pond. After the excursion, a total of 18 various excercises are done by the pupils. This work forms the foundation for participation in various biological competitions, for work submitted in the course of school leaving examinations or for biological Olympiads.

AA

8.4 The didactical principle of consistency and of sequence teaching

VSESUYATSKIY, B.U.

Usilit preemstvennost mezhdu shkolnimi biologicheskimi distsiplinami (Strengthening the continuity between various parts of the school biology course)
Biologiya v shkole, 53, 1979, No. 1, pp.27-32.

The existing syllabus does not maintain the continuity and logical sequence of the problems explained. This is caused by the fact that individual biological disciplines are mutually isolated; this is also the case in general biology. The fact that each biology discipline is only a part of the integrated biology course is often overlooked. These negative aspects are also manifest in the draft of the new biology syllabus; the author demonstrates this on the basis of the example of the botany syllabus (for instance the term "living nature" is not used, the structure of various parts of the syllabus differ), as well as the syllabus for zoology, human biology and general biology.

FH

8.5. The didactical principle of ostensive teaching and/or the unity of the specific and abstract

GEORGIEVA, V. - ANGELOVA, M.

Za naglednostta pri formirane na nakoyi taksonomichni pontiya po botanika (On the ostensive nature of forming some taxonomic botanical notions)
Biologiya i khimiya, 22, 1979, No.4, pp.35-40.

In botany lessons in the 5th and 6th classes, where plant systems are taught, ostensive natural, as well as artificial aids should be used. In the first stage of the teaching process it is necessary to use living natural material. When deriving various systematic units it is useful to use various diagrams which show the various parts of a plant in such a way that the pupil is able to comprehend determining signs which are typical for a specific systematic unit (class, family, genus or specie). Procedures used in identifying and classifying plants are demonstrated on the basis of the leguminosae, brassicae, rosae, solanae, lamniaceae and liliaceae families.

LR

8.6 The didactical principle of combining theory with practice

GREKHOVA, L.I.
Priobshcheniye shkolnikov k ipatovskomu metodu
(Acquainting pupils with the Ipatovsk method)
Biologiya v shkole, 53, 1979, No.2, pp.60-62

Pupils should become acquainted with the successes achieved by science and technology, with new technological processes, etc. One concrete example of such progress are the experiments carried out by the farmers of the Iparovsk district in the Stavropol region. This district is in a zone where conditions for raising crops are not good. In winter, temperatures drop to -36 °C, while in the summer they go up to + 45°C and dust storms are frequent. Specialists and administrators in agriculture, together with Party organisations, have developed such organisational and technological systems which make possible the harvesting and transportation of crops in optimum conditions and at the proper time; the use of progressive technology assures both harvesting and post-harvest cultivation of the soil. The work plan is drawn up with the cooperation of Party and Komsomol organisations. In order to make maximum use of the available technology for 20 to 22 hours every day, additional people come to work in agriculture - for instance 100 teachers worked as harvesting combine drivers. The good organisation of work made it possible to double or triple the output of combines, carrying out the harvest in a shorter period of time - in thirteen days and the planting of winter wheat during 15 days.

FH

SHEREMETEVA, V.A.
Kak my znakomim uchashchikhsya s prakticheskim znacheniyem biologii (How we acquaint pupils with the practical significance of biology)
Biologiya v shkole, 53, 1979, No.5, pp.62-65.

The task of the teacher is, among others, to carry out the economic education of their pupils. One method of implementing this task is to arouse in pupils an interest in the practical application of science. In this article, a biology teacher, who is also the leader of a production brigade made up of pupils, writes about her endeavours to acquaint pupils with the importance of biology for the national economy. Topics concerning genetics provide a number of opportunities for this - for instance plant selection, the selection of animals and microorganisms. Teaching can be combined with practical work in the fields and with an excursion to a breeding station, where the pupils can combine practical observations and theoretical learning. The production brigade of pupils helps in sugar beet cultivation and at the same time studies the influence of the radiation of seeds upon crops. When discussing the topic of genetics and medicine, a physician was invited to the school, who spoke about hereditary disease. The pupils themselves prepared a conference on "Biology and Man". Many graduates of the school chose professional car_eers connected with biology.

FH

8.7 The didactical principle of an individual approach to pupils

HOFFMAN, E. - WEST, T. - BATES, P.
Exceptional Children in Intermediate and Secondary Science Programs: A Teacher Survey
Science Education, 62, 1978, No.1, pp.11-17. 2 tabs.

The article discusses the fact that in recent years teachers in intermediate and secondary schools are encountering increasing numbers of exceptional students. The authors carried out a research project in which they attempted to determine, on the basis of questionnairs, the scope of this phenomenon. The questionnairs concerned five groups of problems: contacts between teachers and exceptional students, types of exceptionality, suggestions for changes in views held on exceptional students and comments by teachers on this subject. The findings of the project indicate several conclusions. For instance in spite of the fact that all the respondents had exceptional students in their classes, nowhere was any single type of exceptionality predominant. Teachers tended to distinguish two contradictory types of exceptionality - an academic type and a sensory type. Both types are described in greater detail, as far as their method of thinking is concerned, as well as the demands they make upon teachers and learning methods.

RA

SPERONI, G.B.

An Individualized Approach to BSCS Biology

The American Biology Teacher, 40, 1978, No.5, pp.318-320, 3 figs, lit.1

The author describes her experience with an individual approach to biology teaching in high schools. This approach is deemed necessary because only part of the students will continue their education in college, while the majority will go to jobs after graduation. The author teaches a total of 18 minicourses in biology. The aim of all of them is to support critical thinking. The article describes the structure of the mini-courses in general terms and then on the basis of the example of the topic "The Variability of Cells" in greater detail. On the basis of the example of the topic "Meiosis and DNA" procedures which students should adopt are described. After completing each course, the student takes a written examination.

RA

ZEGLIN, G.

Moja współpraca z ucznami zdobnymi (My cooperation with talented students)

Biologia w szkole, 32, 1979, No.1, pp.42-43.

The author provides information on cooperation with talented students at the general education secondary school in Elblag where whe has been teaching for 26 years. The fact that this cooperation has been fruitful is documented by the fact that 56.4 % of all students are accepted for study at an institution of higher learning. The author's pupils have been successful in various biological competitions, as well as in other competitions. In the course of individual work the pupils are guided towards independent systematic study of special literature, towards rational methods of work, towards the collection of factual material and data, towards skills in the cultivation of plants and the breeding of animals. Also excursions are organised, selected films are screened, papers are prepared and various aids for biology teaching are made. In lessons devoted to repetition the individual work done by pupils is utilized. Biology hobby clubs have up to 20 members and include pupils from various classes. In these clubs various projects, which the pupils work on individually, include problems of international cooperation in nature conservation, the conservation and protection of the Baltic sea, the fauna of Africa, America and Australia, the contribution made by Polish biologists towards the development of science, the cybernetics of life, homeostasis, plant tissue and animal tissue, etc.

The author also cites examples of topics for biology Olympiads. With talented pupils she carries out a summarizing repetition and broadening of the material they have already learnt, especially difficult topics are explained again and consultations before participation in competitions are organised.

AA

8.8 The didactical principle of taking interdisciplinary relations into account

BADY, R.J.

Methodological Issues in Formal Operations Research: That Does It Mean To Be Formal ?

Science Education, 62, 1978, No.2, pp.233-239, 3 tabs.

In recent years interest in the work of Jean Piaget had increased, especially in his theory of the various aspects of formal operations. The question, however, remains about what it means to be formal. Two possible definitions are cited. The article deals in greater detail with an analysis of the first of them. Special stress is placed on interdisciplinary relations. For the study itself a model was chosen with five distinct parts. 66 randomly chosen persons were studied on its basis. Each problem they were asked to solve was assessed by zero (an error) or one (correct anwser). The findings are summed up in the tables.

RA

BANTJE, O.

Schwerpunkte und Grenzen der Mathematisierung des Biologieunterrichts (The most important aspects and limits of the mathematisation of biology teaching)

Der mathematische und naturwissenschaftliche Unterricht, 32, 1979, No.3, pp.166-172, 4 figs.

The most important opportunities for the mathematisation of biology teaching are in those topics where the possibility of a break down into elementary parts exists, as well as large amounts of available data which is reliable, can be properly interpreted and is easy to survey. The author cites examples of the use of mathematics in biology teaching, such as the Hardy-

Weinberg law on population genetics, growth functions in various applications, the semi-quantitative expression of sigmoid growth, allometry, biostatic analysis, differential equations as mathematical models and Rubnersch's rule of surface.

AA

RASHKOVA, R. - NENKOVA, E.
Mezhdupredmetni vrzki pri uroku na tema "prilepi" v VII. klas (Interdisciplinary aspects of a lesson on the topic of bats in the 7th class)
Biologiya i khimiya, 22, 1979, No.3, pp.43-47

In explaining the adaptability and special aspects of bats in relation to the environment, various interdisciplinary relations can be implemented in relation to physics, chemistry and geography.

The relation to physics is important in explaining the adaptation of bats' bodies; the physical laws which make it possible for the bat to take off and to stay aloft. Also the problem of bats' perception in space and their ability to communicate on the basis of ultrasound require physical explanations.

Chemical aspects are encountered when explaining the bio-chemical metabolic processes which take place in bats when they fall into winter hybernation and their body temperature is markedly low.

Relations to geography can be stressed by studying the various localities where individual species of bats can be found.

LR

TREITZ, P.

Mit den Schnaken leben lernen - Fachübergreifende Unterrichtsmodell für das 7. - 9. Schuljahr (Learning to live with mosquitoes - An interdisciplinary model for teaching in the 7th - 9th classes)

Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.8, pp. 241-246

The struggle against mosquitoes provides a number of opportunities for the implementation of interdisciplinary relations in biology teaching. The author describes various methods of combating mosquitoes, including the breeding of natural predators of mosquitoes (fishes in water canals, swallows in artificial nests), as well as measures taken against mosquitoes by administrative bodies or by individuals. Chemical methods of combating mosquitoes, such as Abate-Cyanamid and Fenethcarb are described, as well as genetic types of combating pests (the work done by the Institute of Genetics in Mainz). It is also important to learn about the biology of mosquitoes. Of 30 species which live in the Rhineland, only a few attack man. The article compares the most important species of mosquitoes and shows how to distinguish them from Harelquin flies, for which they can be mistaken. Also new methods of combating mosquitoes are explained, such as the lipid method, where the surface of water is sprayed with a fatty substance and then with a detergent, or growth regulators, where hormones prevent the larva from changing into an imago. Mosquitoes can also be combated with the aid of fungi, bacteria and viruses. But all these methods require a very good knowledge of the environment and the specie of mosquito. Everything should be done to prevent the effect of these methods on other elements of the environment.

AA

8.9 The didactical principle of hygiene and safety in biology teaching

HOMOLA, J. - PRONĚK, J.

Zásady bezpečnosti práce v laboratořich a odborných pracovnách přírodopisu a biologie na základní škole a gymnáziu (The principles of work safety in laboratories and specialized classrooms for natural sciences and biology in basic schools and in general education secondary schools)

Přírodní vědy ve škole, 30, 1978/79, No. 3, pp.90-92

The article acquaints the reader with legal and safety rules, standards and instructions for work in laboratories and specialized classrooms. It contains general instructions for the organisation and safety of work and sums up the obligations of the teacher in this respect. It also provides methodological instructions and basic work rules which should be included into the operational guidelines for laboratories and specialized classrooms, including measures against accidents.

VČ

SEMENOV, A.S.

Tekhnika bezopasnosti pri rabote s formalinom

(Safety rules for work with formalin)

Biologiya v shkole, 53, 1979, No.2, p. 71

The formalin available in laboratories usually has a concentration of 35-40 %. Usually it is used in concentrations of 5 %. Formalin vapours are dangerous and if swallowed can cause serious poisoning. For this reason when this chemical is used the following precautions should be taken: 1) Solutions should be prepared in a fume-chamber or in the open air and bottles should be sealed by paraffin wax. 2) Specimens with formalin should be placed in sealed cabinets and once or twice a month the seals on the bottles should be inspected. 3) The room in which they are found should regularly be ventilated. 4) If the solution is splashed on the skin, it should be washed under running water and then with a 5 % solution of ammonia, which reacts with the formalin to form urotropin, which is not dangerous. 5) If formalin is swallowed, the stomach should be rinsed with a 5 % solution of ammonium carbonate. 6) If the eyes are irritated by formalin they should be rinsed with water and ammonia should be inhaled from a piece of cotton wool. 7) In case of fire, formalin should be extinguished by a fine water spray.

PH

9. Methods of biology teaching

GANEV, Z.

Otnosno podbora na metodi i priyoni pri obuchenieto po biologiya v IX. klas (Basic ways of chosing methods and media for biology teaching in the 9th class)
Biologiya i khimiya, 22, 1979, No.4, pp. 19-22

The selection of suitable methods depends on several pedagogical principles:

1) Teaching methods depend upon the aim of the lesson.
2) The selection of a method should depend also on the specific characteristics of other teaching subjects.
3) The selection of a method also depends upon the concrete subject-matter of the lesson.
4) Besides the selection of the most effective teaching method, it is also necessary to carry out technical preparations for the lesson.
5) Methods and forms used also depend on the material facilities available, especially the planning of labo-

172

ratory excercises.

Besides chosing a method the teacher must also chose suitable teaching media. The author distinguishes logical, organisational and technical media.

LR

KACSUR, I.

Méhany korszerü és modszer alkalmazása a biolóoktatásában (The use of some modern methods and media in biology teaching)

A biológia tanítas, 17, 1978, No.1, pp.18-21.

The author discusses the use of modern graphical methods suitable for use in biology teaching, as well as the principle of feedback and a development diagram.

KATONA, L.

A genetikai ismeretek tanítasa az általános iskolában (Teaching genetics in basic school)

A biológia tanítas, 17, 1978, No.4, pp.121-124

An explanation of basic principles of genetics adapted to the intellect and age-specific abilities of children in the upper classes of basic shool.

NELSON, B.J.

Correlational Relationships Between the Role of the Elementary School Teacher While Teaching Science and the Science-Teaching Practices Used

Science Education, 62, 1978, No.1, pp.53-58, 4 tabs.

An attempt to determine whether teachers who teach the natural sciences in a larger number of classes use different methods of teaching in comparison to those who teach only in a single class. The study was carried out at three public schools in east Missouri. The teachers received questionnairs with 37 questions, which concerned such problems as for instance the characteristics of the teacher, the teaching methods used by him, the availability of various methodological aids, the factors which influence the effectiveness of teaching, etc. The findings of the study are summed up in tables and discussed in detail in the text. In conclusion, topics for further studies in this area are cited.

RA

STAWIŃSKI, W.
Metody uczenia się biologii (Methods for learning biology)
Biologia w szkole, 32, 1979, No.2, pp.59-64

The author analyses learning methods in biology, in the context of recommendations made on this subject in the syllabus for general education secondary schools. He discusses work with a textbook, with journals and specialized literature, with taking notes and their later use and the preparation of seminar papers by pupils. Various logical procedures are stressed and various methods described which are divided into four groups: 1) methods of independent learning about nature, which are often characterized by creative activities or the solution of problems, 2) methods connected with acquiring ready knowledge on biology, 3) methods connected above all with carrying out practical activities whoch serve for learning skills and habits, 4) methods used for strengthening knowledge, self-control and self-assessment. The role of the teacher in acquainting pupils with learning methods is stressed.

AA

YEANY, R.H., Jr.
Effects of Microteaching with Videotaping and Strategy Analysis on the Teaching Strategies of Pre-service Science Teachers
Science Education, 62, 1978, No.2, pp.203-207
1 fig., 2 tabs.

The author acquaints readers with a study to determine teaching methods used in a single teaching lesson, in which a teacher uses audio-visual aids for teaching future science teachers. For this purpose Anderson's spectrum of 10 teaching methods was used, which were arranged on a scale beginning with a direct exposition (a verbal explanation of facts) up to indirect induction which at present is considered to be the optimum method of teaching (on the basis of a study of students' opinions on this subject). The article describes the methodology of the study, the sample used and the findings obtained, together with their analysis. It was found that an individualized approach based on audio-visual method of the teacher in teaching can have a number of advantages, but for increasing the effectiveness of teaching, a certain direct contact between student and teacher is necessary.

HA

9.4 The method of coherent explanations

OKEY, J.R.
Systematic Procedures in Science Instruction
Science Education, 62, 1978, No.1, pp.109-117

The effectiveness of teaching can be improved at all levels by a thoroughly systematic approach. The article describes several systematic approaches in the course of teaching and comments their use. Also methods which both scientists and educators can use in the course of teaching are discussed. It is important to define points of departure and to specify aims and targets, as well as a hierarchy of importance of the topics to be taught. Then a diagnosis of the studied problem should be provided, a plan of the material necessary for the explanation and a choice of suitable teaching media. The author attaches general comments and recommendations on each item. The arguments posed by those who oppose systematic approaches are cited in conclusion.

RA

9.5 The method of questions and answers

RILEY, J.P.

Effects of Studying a Question Classification System on the Cognitive Level of Pre-service Teachers' Questions

Science Education, 62, 1978, No.3, pp.333-338, 1 fig., 5 tabs.

During the last decade many alternative testing methods have been developed for improving the cognitive level of teachers' questions. The aim of the study reported on in the article was to determine whether the hierarchy of question classification influences the cognitive level of questions in class. One hundred teachers who had studied at the University of Delaware participated in the project. The experimental group first underwent a three and a half year excercise period in which it learnt to assess anwsers, while the control group did not undergo this training period. The basis for assessment during the study was a 2 x 2 factorial equation. The assessment criteria are cited, the course of the testing hypothesis and the findings of the study, which are statistically assessed and summed up in tables.

RA

9.6 The method of working with literature (textbooks, the syllabus, worksheets, workbooks, atlases, keys for identifying natural specimens, etc.)

DAVIS, A.P.

A Science Teacher, A Reading Teacher ? A Workshop with Answers

Science Education, 62, 1980, No.2, pp.181-186

The author of the article acquaints the reader with some of the problems dealt with at a science teacher workshop held in 1977. The main problem dealt with was how a science teacher should go about teaching his students to correctly read textbooks and other reading material. The teachers discussed certain skills, such as the interpretation of graphs and diagrams, how to follow instructions for laboratory work, how to formulate important facts and how to combine them into larger units. During the workshop the teachers also learnt how to plan a teaching lesson which would include these various techniques. In conclusion a survey is provided of what a teacher should do if he wants to teach his students to read specialized texts in a proper manner.

RA

VLADIMIRSKAYA, G.N.

Uchit rabotat s uchebnikom (Learning to work with a textbook)

Biologiya v shkole, 53, 1979, No.1, pp.41-44.

Teaching pupils to make their way in a large amount of information begins by teaching them to make their way in a textbook. The effectiveness of working with books depends upon skills in making use of various parts of the textbook, such as the methodological introduction, the table of contents, the symbols used, the bibliography and index. The most important of these is the table of contents, on the basis of which it is for instance possible to determine the systematics of fauna used. Also the division of the text into various columns facilitates learning. Pupils should also be able to distinguish what is written in italics, in roman type and in boldface. Symbols (such as triangles, squares, circles, question marks and exclamation marks designating various items) can be found in most textbooks and pupils should learn to uderstand them.

FH

9.7 The method of observation

BINDER, H.
Einsatz gebrauchsfertiger farbbeschichteter Objektträger (The use of slides with layered colouring for immediate use)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.6, pp.165-166.

The firm Boehringer from Mannheim has developed slides for microscopy with layers of colouring for immediate use. They are called Testsimplex R and are available in boxes of fifty. They are intended above all for staining blood cells and lymphocytes and their identification. They can also be used in teaching, since the law allows the teacher to obtain blood from his own finger (not that of a pupil!). The author describes the use of these slides.

AA

BOGENRIE, A.

Eine einfache Druckinfiltrationsapparatur zur Messung der Spaltöffnungsweite bei Pflanzen (A simple pressure infiltration apparatus for measuring the width of plant ducts)

Der mathematische und naturwissenschaftliche Unterricht, 32, 1979, No.5, pp.292-297.

Studies concerning the state and size of plant ducts are important for the ecological study of plants. It provides valuable information on the momentary state of water in the plant and its metabolism. Pressure infiltration is a relatively simple method of determining the state of ducts. This method can also be applied in the course of field work on the basis of simple apparatus which is described in the article and illustrated with a drawing. The author also provides instructions on measuring techniques and describes his own practical experiences.

AA

DREISMANN, G.

Zur evolutionsorientierten Betrachtung des agoistischen Verhaltens eines Fisches (Lepomis gibbosus, Centrarchidae) (The observation of the agonist behaviour of the pumpkin seed fish (Lepomis gibbosus of the Centrarchidae family)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.12, pp.318-324, 4 figs.

The author describes the behaviour of an aquarium fish - the pumpkin seed. The description concerns above all the rituals in which the fish participate, how they tend to wound a rival and the evolutionary significance of this agonistic behaviour during which the fish try to make an impression, act in a threatening manner, attack and either humilate their rival or express their submission to him and then escape. These fish usually require live food, only to a limited extent will they accept Tetra Min. For purposes of observation usually two fish are kept in a ten litre aquarium which is divided into two compartments by a styroporous board. Both fish should be of approximately the same size. The author explains the behaviour of the fish throughout the ritual.

AA

EISENHABLER, F.
Projektion von Beobachtungen und Experimenten (The projection of observations and experiments)
Biologie in der Schule, 28, 1979, No.7-8, pp.323-328.
1 fig.

Projections save time and chemicals, but until now they have not been used extensively. Projections can be done with the aid of a diascope or a Pollylux apparatus. The author first discusses the advantages, limitations and his own experiences with these projections and also various organisms or their parts which are suitable for this (small objects are placed between two slides, larger objects are left freely), as well as the projection of physical process, chemical reactions and biological processes (for instance the movement of fish, the respiration of fish, the cross-section of a bean seed, the root system of a plant, staining starch samples, the movement of a hydra grisea, osmosis and others.)

FH

GUILLARD, J. - GUILLARD, C.M.

Documents pour l'étude des cycles de vie en classe de cinquième - évolution d'un aquarium (Documents for the study of life cycles in the fifth class - development in an aquarium)

Biologie, Geologie, 66, 1979, No.3, pp.442-444. 2 figs.

In the fifth class pupils can easily observe the development of flora and fauna in an aquarium during three stages: during the winter, at the beginning of March and from March until June. The author cites examples for observations and what should be stressed by the teacher in each case.

LR

YANALOV, S.D.

Organizatsiya fenologicheskikh nablyudeniyi v nashey shkole (The organisation of phenological observations in our school)

Biologiya v shkole, 53, 1979, No.5, pp.65-66.

The author describes phenological observations which have been carried out at his school since 1961 and in which all pupils participate. The main aim of the observations is to obtain data for filling in a questionnaire provided by the Phenological Commission of the Republic, to which the data is then sent. The pupils in lower class keep calendars of developments in nature, while in the upper classes they become acquainted with the importance and methods of registering phenological observations in the vicinity of their homes. From time to time the pupils show their records to the teacher. The findings are also published and used in class work.

PH

KUPRIYANOVA, M.K. - SHCHENNIKOVA, Z.G.
Osenniye fenologicheskiye nablyudeniya (Phenological observations carried out in the autumn)
Biologiya v shkole, 53, 1979, No.5, pp.67-71, 4 figs., 6 tabs.

During observations, methods developed by Batmanov are used, which distinguish basic and integral descriptive methods. On the basis of the former, a descriptive characteristic of a phenomena is obtained by recordings in a diary, often with the aid of various abbreviations and signs. The latter method requires the determination of percentages of incidence of a given phenomenon at a specific place, based on the stage of its development.

The article describes the tasks of phenological observations undertaken in the Vth to VII th classes; some of them concentrate on observations in various ecological conditions. The article also includes tables and graphs on the findings gained from these observations.

FH

LEHMANN, F.
Ein einfaches Registriergerät für Aktivitäten von Versuchstieren. (Aktograph) (A simple registration apparatus for measuring the activity of experimental animals - an actograph)
Praxis der Naturwissenschaften-Biologie im Unterricht der Schule, 28, 1979, No.5, pp.123-124, 2 figs.

For observing the activity of animals usually a kymograph is used. The author describes in detail (together with drawings) a new registration apparatus - an actograph. It is capable of recording the activity of an animal for up to two weeks. It is composed of a driving mechanism, a recording cylinder and a writing system and can be made out of a building kit. An alarm clock can serve as the driving mechanism.

AA

MEINEL, W. - MATTHIAS, U. - SCHÖCKE, K.
Eine neue Methode zur Beobachtung von Fliesswasserorganismen im Rundstromkanal (A new method for observing organisms living in flowing water in a jet channel)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.12, pp.315-317.

Observing organisms in flowing water, especially aquatic insects, is very difficult; the authors therefore recommend organising these observations in a model of flowing water under suitable simulated conditions. The model is described in detail. It is composed of an inner ring made of plexiglass (30 cm in diameter) and an outer ring made of the same material (40 cm diameter). The hight of both rings is 8 cm; the floor of the model is made of river sand and pebbles. A submerged pump is used to form a flow of water. The adaptability of aquatic organisms to a water flow is studied: may flies from the family Exdyonuridae, black flies (Simulium) and hydropsyche (for instance Sericostoma) can be used. The author describes the life of these insects, their development cycles and also the effect of toxic substances (for instance in polluted water) upon these organisms.

AA

MEUSER, H.

Die Fliegenfalle - Besonderheiten der Blütenbiologie am Beispiel der Eidechsenwurz (Saurotamum guttatum; Araceae) (Specific aspects of flower biology on the basis of the example of of Saurotamum guttatum;Araceae)

Der Biologieunterricht, 15, 1979, No.4, pp.63-65, 10 figs.

The author describes an interesting plant indigenous in the Indian Himalaya Mountains - the Suromatum Guttatum of the Araceae family. It is well known from botanical gardens and it provides good opportunities for teaching plant biology. The flower and leaf generations are sharply distinguished. In the spring, even without water or soil, the flat rootless tubers will develop 30 to 70 cm. high inflorescence spathes with red colouring. After the tuber has bloomed it is planted into soil, where it takes root and grows a single leaf with a long, spotted petiole. The inflorescence smells of carrion. The author describes experiments with individual seeds and various interesting observations.

AA

NAUMANN, K.

Erkennung bakterieller Pflanzenkrankheiten (Diagnosing bacterial disease of plants)

Biologie in der Schule, 28, 1979, No.7/8, pp.340-345. 9 photos.

More than a third of the world´s crops are destroyed by pests. 50-55% of these are animals and 35-40 % are plants. Among them, bacteria are of special importance, as well as fungi. Plant disease caused by bacteria have the following symptoms: spots on leaves, wet decomposition, wilting, tumors, etc. The author discusses the isolation of bacterial infections and their identification. In conclusion he cites objects which are suitable for the study of bacterial disease of plants in school conditions.

FH

NEDVÍDEK, J. - HABROVÁ, V.

Mitosa v buňce rostlin a živočichů (Mitosis in the cells of flora and fauna)

Přírodní vědy ve škole, 30, 1978/79, No.9, pp.324-327. 4 figs.

The root tips of ordinary onions or the bulbs of other plants, as well as the root tips of germinating beans, peas, etc. are suitable for the observation of mitosis and are easily available. The most frequently used are the root tips of onion. For preparing a suitable specimen, tips of about 5 mm are sliced off the onion, placed in a tube with gauze and submerged into a mixture of 96 % alcohol and glacial acetic acid at a ratio of 3 : 1 for fixation for a period of 2 to 7 hours. Staining is done according to Feuglen with an optimum hydrolysis period of 6 minutes. The stained root tips are then transferred into a single drop of water on a slide and one or two mm are sliced off the tip. The remnant is cleared away. The tip is then crushed by pressing a cover glass to the slide with a rubber band. The specimen is thus spread on the slide. Then the cover glass is taken off with the aid of a needle. In the meristem of the root tip we can see besides nuclei interface and chromatine grains also a large number of cells in various stages of mitosis. The nuclei and chromosomes (structures containing DNA) are stained purple. Mitotic figures can also be found in specimens made of the tail tip of the larva of a newt. After fixation, Schiff´s reagent is used for staining (or hematoxylin or Giems solution).

VČ

NIEMIERKO, M. - FREJLAK, S.
Obserwacje fenologiczne w szkole (Phenological observations in school)
Biologia w szkole, 32, 1979, No.4, 170-175, 4 figs. 1 tab.

Phenological observations have a long tradition in Polish schools. Scientific phenological observations have been carried out since the 19th century when meteorological stations were founded, as well as theoretical institutes. Also some agricultural institutions carried out phenological observations. The most often applied are phytophenology and less often zoophenology. The author provides various information on the history of phenological observations in Poland. The gathering of phenological data and their analysis aims at preventing negative consequences of changes in the climate upon flora and fauna. They are important for the national economy, especially for agriculture, for orchard keepers, foresters, game keepers, bee keepers and for medicine. In Poland there are special institutions for meteorological observations, as well as those devoted to the water economy, which all contribute to phenological observations. On the basis of suitable examples, the authors show how all this can be made use of in biology teaching.

AA

ROMASHOVA, A.T.
Fenologicheskiye nablyudeniya v shkolakh
(Phenological observations in schools)
Biologiya v shkole, 53, 1979, No.5, pp. 64-65

The draft of the biology syllabus assumes the organisation of phenological observations and the use of their findings in class. The syllabus stresses well known and well observable phenomena which are sufficient for forming a concept of changes which take place in nature in the course of the year. The article cites activities for spring, summer and autumn observations. The Geographical Society of the USSR has prepared worksheets for phenological observations which include graphs into which the beginnings of various phenological phenoma are filled in for various areas.

FH

SCHMALE, E. - ZÖLLER, W.

Die Amsel "Guiseppe" - eine Beobachtung als unterrichtlicher Impuls (The blackbird Guiseppe - observations as an impuls for teaching)

Der Biologieunterricht, 15, 1979, No.1, pp.57-60.

The author provides information on the inborn and learnt singing of birds. Some birds are born knowing how to sing, while others only have an inborn basic voice structure and must learn how to sing in their so-called sensitive phase, i.e. when they are young. The author studied the example of blackbirds. One such bird, which the author observed, sang a melody from the opera Rigolleto by Verdi (La donna é mobile...). The blackbird always sang the six tones in the same sequence. The author also discusses the singing of warblers and thrushes who are born with the ability to sing, chaffinch who are born only with the vocal framework for singing and must learn to sing, the bullfinch, who learns to sing only from his father and the Icterina warbler who has an inborn ability fo juvenile singing and then learns from all other birds living in the vicinity (he is an imitator).

AA

SCHWÖRDER, F. - SCHNEIDER, V.
Zur Behandlungen der Osmose im Unterricht
(On teaching the topic osmosis)
Naturwissenschaften im Unterricht-Biologie, 27, 1979,
No.12, pp. 367-378, 8 figs.

The author describes an apparatus, which can easily be assembled, used for group work of pupils during classes. The topic of osmosis has 6 to 8 hours devoted to it and is divided into five sections: the intake of water, diffusion, osmosis, osmotic pressure and osmosis in man. The whole topic is developes in a problem manner and provides suitable motivation. During teaching the independent work of pupils predominates, with model expriements, as well as experiments with objects. Osmosis is dependent upon the functioning of semi-permeable membranes which make it possible to transport molecules through the membrane for which it is permeable, while for other particles it is not. The development of these semi-permeable membranes was an important step ahead in the process of evolution.

AA

THIESSEN, H.
Die Herzaktion - Veranschaulichung im Unterricht
(Cardiac action - its demonstration in teaching)
Naturwissenschaften im Unterricht - Zeitschrift für
die Unterrichtspraxis der Sekundarstufe I, 27, 1979,
No.2, pp.45-49, 4 figs.

The author discusses various opportunities for explaining to pupils the action of the human heart. He used an amplified recording of heartbeat, a functional model of cardiac action, a diagram and transparencies, as well as school films. Also the aspect of interdisciplinary relations is stressed: the action of a pump, the time sequence of cardiac action, the movement of the valves and their significance. The sound of heartbeat can be played for the students from a phonograph record or a tape recording (a microphone can be used for making recordings in class) and pupils can listen to heartbeat with a stethoscope. A use of a functional model of the heart is recommended, as well as a diagram of heart action, and an graphic representation of the four strokes of heartbeat.

AA

WEINREICH, G.
Erfahrungen zur Entwicklung der Beobachtungsfähigkeit
(Experiences with developing observation abilities)
Biologie in der Schule, 28, 1979, No.1, pp.7-9

The article is a paper which the author presented to the VIIIth Pedagogical Congress. In biology teaching it is necessary to devote attention to the use of specific natural science procedures. One of these are observations. Biology teaching uses this method in a systematic manner for the first time in the 5th class. Pupils learn to plan, carry out and assess the outcome of observations. However, observations during biology teaching are very difficult to carry out. In the 8th class the pupils can observe their own bodies. When a magifying class or microscope are used, observations become much more complex. Also during excursions there are many opportunities for observations.

FH

WILFERT, M.
Hinweise zur Lebenduntersuchung von Einzellern
(Procedures in studying living single cell organisms)
Praxis der Naturwissenschaften-Biologie im Unterricht der Schulen, 28, 1979, No.10, pp.263-264. 1 photo.

Living specimens of unicellular organisms are difficult to obtain and to demonstrate in view of their great mobility. Their movement can be slowed down by cotton wool, gelatine or other substances; for marine forms this can be done by higher salt concentrations in water. Such procedures are too complex for pupils to carry out. The author therefore recommends adding a solution of nickel dichloride ($NiCl_2$) to rapidly swimming ciliates (one or two drops into a large drop with protozoa) or drugging them with magnesium chloride (several drops of 3 % $MgCl_2$); for marine fauna a 5-7 % solution of magnesium chloride can be used. Fresh water, marine and parasitical unicellular organisms can also be drugged by a 0.05 - 0.015 % solution of protaminosuphate. For the observation of unicellular organisms the author also recommends the use of a scpecial apparatus called a rotocompressor.

AA

WITTE, J.
Die Bestimmung des Sauerstoffgehaltes in tieferen Wasserschichten (The determination of acid content in deeper layers of water)
Praxis der Naturwissenschaften-Biologie imUnterricht der Schulen, 28, 1979, No.9, pp.245-246.

For determing the acid content in water, in the upper classes of general education secondary school according to Winkler it is sufficient to assess the colour of sediments. Various test and comparison kits are commercially available. However, to obtain data from deeper layers of water continues to be a problem if the sample is to remain free of acid from the upper layers and free of contact with the air. Especially stagnant waters in the summer months develop various layers, which are important from the point of view of limnology. For these purposes it is important to map the water layers, vegetation on the banks, interview anglers about the incidence of various fish, etc. The water can best be studied from an inflatable raft, the temperature of the water can be taken with a maximum and minimum value thermometer. Water samples can be taken with a slightly adapted bicycle pump or large injection syringe.

AA

9.8 The method of experimentation

ABRAHAM, R.
Ein Modellversuch zur Populationsentwicklung bei Tieren mit Beispielen aus der biologischen Schädlingsbekämpfung (A model experiment concerning the development of animal populations with the example of the biological combating of insects)
Der mathematische und naturwissenschaftliche Unterricht, 32, 1979, No.7, pp.428-433, 2 figs.

With the help of marbles, which represent individuals in a population, the author describes experiments which demonstrate the manner in which population regulation mechanisms function and how they influence a stable and constant population. Carniverous animals in nature (predators) can achieve a stable equilibrium with the population they hunt. The author discusses experiments of the Lotka-Volterra type. The constancy of the population is possible only when mutual regulation of all species in the animal community takes place. The experiments deal with exponential growth, the rules of development of a model population and the influence of parasites upon a population.

AA

ABRAHAM, R. - PFISTERER, J.

Über die Erwärmung von wechselwarmen Tieren durch Sonnenstrahlen. Unterrichtsversuche in Ökologie für die Sekundarstufe II. (On heating poikilothermal animals by sun rays.

Experiments in ecology for the upper classes of secondary school)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.10, pp.253-259, 5 figs.

At the Zoology Institute in Karlsruhe an interesting experiment has been developed for practical zoology excercises, which concerns the heating of cold blooded animals by sunlight. In the article the experiment is adjusted for use in secondary schools. It is carried out with the help of a special thermometer where strips of copper are soldered on to both ends. One end of the thermometer is maintained at constant temperature, while the other end is applied to the body of an insect. Freshly killed insects such as grass-hoppers, crickets, flies, wasps, locust or phasmidae can be used, or in the winter time the larva of the yellow mealworm. The increase in temperature is usually 2-3 °C and may differ in various parts of the body. The temperature of insects is determined by the colour of the insect's body, its structure, the amount of hair it has, its size, the shade provided by wings and the extent to which its body is convex. Such experiments are suitable for teaching ecology, and for studying the influence of light and radiation.

AA

AUSSEM, R.

Simulation von Kreuzungsexperimenten mit Hilfe eines Computers (An experiment in cross-breeding aided by a computer)

Biologieunterricht, 15, 1979, No.2, pp.59-66, 3 figs.

Teaching classical genetics in the 12th and 13th classes of general education secondary schools in the German Federal Republic usually is of a theoretical nature; it is however, possible to undertake, together with students, a simulated experiment in cross-breeding. The basic phenomena and laws developed by Mendel and Morgan can very well be simulated experimentally with the aid of a computer. The author recommends the use of BASK computer and the violet viola palustris. The colour of the flowers is followed (pink, white, violet) as well as dominance and the forming of anthocyanins and relative frequency of new types of genes, etc.

AA

BABL, A. - SCHWANKER, R. - SPIES, R.

Reizphysiologische Experimente mit Gnathonemus petersii - einige Einleitungen (Physiological experiments with excitation in Gnathonemus petersii - some instructions)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.5, pp.113-123. 13 figs., 2 tabs.

For teaching in the upper classes of secondary school the authors recommend experiments with excitation where the African tropical fish Gnathonemus petersii, from the family Mormyridae, is used. During these experiments the students work with natural objects and modern instruments (an oscilograph, pre-amplifier, pulse counter and tape recorder). The above cited fish is one of the weakly electrical fish, which use electrical impulses in turbid water for active or passive localisation. Their electrical source is found in the tail and their electric charge reaches as much as 1 V and electric field strenght is 1 mA. The authors describe how to measure the charge, record it and how to register the impulses on a tape recorder, experiments with excitation by various forms of impulses, the recording of daylight and nocturnal voltage activity, the registration of impulses at various temperatures, excitation with a parallel magnetic field and a perpendicular electrical field. Also the facilities in the aquarium which are needed for breeding this very interesting electrical fish are described.

AA

BANNWARTH, H. - BANNWARTH, W.

Acetabularia - ein geeignetes Object zur Untersuchung zellkerncytoplasmatischer Wechselbeziehungen im Biologieunterricht - Teil I: Merotomieversuche

(Acetabularia - a suitable object for studying the mutually changable relation between the nucleus and cytoplasma during biology teaching. Part I: Experiments with merotomy).

Der Mathematische und Naturwissenschaftliche Unterricht, 32, 1979, No.8, pp.485-490, 10 figs., 3 tabs.

Acetabularia are suitable objects for biology teaching. Their cells have a number of advantages in that they not only provide a natural and suitable object for scientific study, but also for the independent work of students. The cells of the Acetabularia are exceptionally large and capable of regeneration, with or without nuclei. It is therefore suitable as a model plant for experiments concerning basic questions of cellular biology. The authors suggest simple experiments with the Acetabularia, which practically require only cutting with a pair of scissors - the so-called merotomy of cells. During these experiments the relation between cytoplasma and the nucleus is studied. The size of the cell is studied (6-10 cm!), unicellular and uni-nuclear cells, their regeneration abilities, the position of the cell nucleus, polarity, the size of the nucleus (0.1 - 0.2 cm), the extraction of the nucleus, how it can be isolated, the ways exchangability of nuclei between two cells functions. Also a cell with a nucleus is compared to one without it, the factors which influence the shape of the Acetabularia are studied, the influence of the size and structure of the nucleus,interventions into the cytoplasma, etc. The Acetabularia is thus a fine example of a plant suitable for the study of general biology and cytology.

AA

BIRETT, H.
Versuche zur klassischen Konditionierung (Experiments with classical conditioning)
Der mathematische und naturwissenschaftliche Unterricht, 32, 1979, No.2, pp.98-103

When the eye encounters a strong gust of wind, the eye lid closes. Some experiments can be carried out concerning this reflex which closes the eye. For this purpose it is necessary to produce gusts of wind which can be reproduced as the need arises. The experiment concerns the topic Learning, or can be added to the topic on reflexes, especially the polysynaptic alien body reflex. The reflex can also be used to illustrate various learning theories. Essentially the experiment is carried out in such a way that together with the gust of wind, another impuls is provided, such as hitting the back of the hand with a stick, lighting a lamp in front of the eyes and snapping fingers next to the ear. After several repetitions the reflex will cause the subject to close his eyes even when no gust of wind is produced, merely by producing the other effects.

AA

BODENSHEIM, D. - ISERT, K.
Erhebung zur Auswirkung des Kindchenschemas in der Werbung (Verifying the attractiveness of the image of young animal or children in advertising)
Praxis der Naturwissenschaften Biologie im Unterricht der Schulen, 28, 1979, No. 4, pp.96-97, 2 figs.

The problem of the impact made by young animals or children was studied with the help of two photographs of children, one aged three days and one aged three months. The photos were cut out and pasted on a neutral blue background. A food shop of medium size was chosen and the same products were decorated either with one of the other photograph. Buyers were divided into groups according to age (15-30, 30-45, and 45-60 years) and into men and women. It was found that the majority of buyers chose the product with the three months old baby, which had the typical attributes of a young specimen of the specie.

AA

BRUCKER, G.
Faktor Temperatur - Analysenverfahren und neue Möglichkeiten in der experimentellen Tierökologie (The temperature factor - an analytical procedure and new opportunity for experimental zoo-ecology)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.8, pp.197-206. 9 figs.

Modern technology can be used in teaching. The author provides information on the use of technical instruments in studying abiotic factors in the environment of animals - and among them temperature. He uses a special apparatus (a drawing of which is provided) which makes use of the advances in semiconductors and uses heating or chilling elements with air or water cooling systems, co-called Peltier element blocks, together with an apparatus for measuring temperature and networks. With this apparatus it is possible to study the relation of poikilothermic and homoiothermic animals to temperature, the relation between body temperature and the temperature of the environment, temperature and reproductive strategy, the perception of temperature, the limitation of life functions by temperature and temperature and behaviour. Observations concerning the frequency of heartbeat of invertebrates (daphnias) are described, the thermoregulation of butterflies, temperature minimums and maximums, temperature "organs" (in insects, centipedes, small crustaceans, asellus beetles, spiders), proof of resistance to low temperatures (thermal minimum) - in spiders and the concept of preferential temperature (in Carambicidae, carabidae, lizards, snakes, mice, and in gerbils).

AA

BUKATSCH, F.

Die Atmung der Mikroorganismen (Kohlenhydrate als Energiequelle II) (The respiration of micro-organisms - sugars as a source of energy II).
Naturwissenschaften im Unterricht - Biologie, *27*, 1979, No. 6, pp.167-171. 4 figs.

Besides fats, sugars are the most important source of energy in the basal metabolism of all aerobic organisms, which form the large majority of organisms living on earth, from unicellular organisms, up to man.

In the course of respiration the break down of sugar occurs, just as in organisms which cause fermentation. But in the former case the influence of aerial oxygen goes through the cycle of citric acid, up to the complete oxydation of sugar into CO_2 and water. The author cites a number of experiments on this topic, such as proof of the respiration of soil, proof of heat generated in the respiration of microorganisms, the consumption of oxygen in the respiration of microorganisms, and proof of the quality of exhaled carbon dioxide.

AA

BUSOLD, M. - GEYER, P. - SPIEGEL, M.
Erhebung zur Wirkung des Kindchenschemas auf Schüler des 5. Schuljahrganges (A study of the effect of the picture of bear cubs on pupils of the 5th class)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.4, pp.88-91, 4 tabs.

After an experiment concerning the pictures of babies, 6 pupils suggested the verification of the impact of a bear cub in contrast to an adult bear upon pupils of the 5th class. The aim of the experiment was to verify what had been learnt in ethology and to determine how advertisments exploit the concept of young animals and babies. The project was motivated by the planning of a film for the sale of toys. Children were asked to put together the bear and donkey they liked best, and were given pictures of various components of a bear's and donkey's bodies which included those from adult animals and those from cubs (young donkeys). The findings indicate that the large majority preferred the cubs to the adults, but boys did not express such a high preference for the young bear, in comparison to girls.

AA

DECKER-EISEL, C.

Der Flaschengarten - eine Möglichkeit zur Erarbeitung einiger Grundfunktionen des Pflanzenlebens (A garden in a jar - an opportunity for learning some basic functions of plant life)
Der Biologieunterricht, 15, 1979, No.4, pp.45-62, 3 worksheets.

The author describes how, with very active pupils, it is possible to develop all the basic functions of plant life in work with so-called enclosed cultures, i.e. small gardens with various plants in a closed glass jar. The author selected suitable plants (Dracaena VAND.Ex L., Chamaedora WILID., Peperonia RUIZ et PAV., Cryptanthus OTTO et A. DIETR., Asplenium nidus L., Pilea LINDL) and placed them in two 50 litr closed glass jars. Only some plants can be cultivated in closed bottles or jars, especially those coming from a humid tropical climate . In work with these plants the pupils follow their growth, consumption of water, of carbon dioxide output etc. It is important to keep records of the garden in a jar, where pupils measure the growth of the plants, what mistakes are made in cultivation, etc. The pupils like this work and at the same time learn the basic functions of plant life.

AA

DIETRICH, J.

Untersuchung über den Zusammenhang zwischen Hauttemperaturabsenkung und Nikotin-Sklerose (A study of the relation between a decline in the temperature of the skin and sclerosis caused by nicotine)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.7, pp.179-187, 5 figs., 3 tabs.

The author provides information on the work of two pupils, M. Jobst and H. Schlupi, who undertook this project at their school in Bad Homburg within the framework of Young Researchers 1978. Man is a warm blooded animal, his hypothalamus regulates his temperature, together with the central nervous system. Thermal losses are constantly incurred through the whole surface of the body, by the evaporation of prespiration, by the excretion of feces and urine - all this causes a negative thermal balance which is overcome by muscular activity. All chemical reactions depend upon the temperature of the body. Their optimum range is 37-38 °C. The author describes the mechanism of thermoregulation in the human body. In the trunk of the body, measured in the rectum, temperature is between 36-38 °C, while in the extremities temperature may decline to between 26-35 °C. Nicotine influences vasoconstriction and narrows the peripheral vessels of blood circulation so that blood does not penetrate to areas directly under the skin and thus the surface of the skin is cooler. After prolonged use, nicotine has sclerotic effects upon the arteries and sclerotic pockets develop where constriction is irreversible. Thus nicotine has a strong influence upon the temperature of the skin. These findings are used by the author to combat nicotine addiction. On the basis of experiments he was able to prove the relation between a decline in the temperature of the skin and nicotine sclerosis. The greater the decline in temperature, the greater the degree of nicotine sclerosis.

AA

200

DÜNCKMANN, M.

Ein Modellversuch zur Genlokalisierung (A model experiment for the localisation of genes)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 12, pp.325-328, 4 figs.

The chromosome theory of heredity is taught within the framework of genetics in the upper classes of secondary school. This subject is also mentioned in topics on animal breeding and human genetics. The culmination of the topic on chromosome theory is the localization of genes on genetic and cytological chromosome cards. How to proceed is shown by the author on the basis of the example of the Drosophila fly, with genes for yeloww bodies, miniature wings and white eyes. All these genes are found in the X chromosome. The author describes the classical cross-breeding of three genes, according to procedures developed by the American scientist Morgan. Tables sum up the outcome of these cross-breedings for the fly Drosophila melanogaster. Also the cross breeding of maize according to Stadler is described, where C genes (coloured) and Sh (shrunken) genes are studies. On the basis of this information the author then suggests a model experiment with the aid of which it is possible to demonstrate crossing over and to determine among which genes exchanges have occured. The model cannot, however, demonstrate the actual percentage of exchanged genes, since in reality also double crossing over can occur.

AA

DYLLA, K.
Schülerversuche zur Wirkung des Kindchenschemas im Kurs Ethologie und in Klasse V. (Experiments by pupils on the influence of an outline of a child in the ethology course in the 5th class)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.4, pp.85-88, 2 worksheets, 4 tabs.

In the ethology course in the 11th class the author distributed worksheets and photographs to his students concerning the problem of children and animal cubs. After finishing the assignment, the student understood that they themselves were the objects of an experiment. The most interesting was the experiment where the students were asked to compose a picture of a child, a bear cub and a young donkey out of cut out components; besides components typical for children or cubs they also had adult features in the cut outs. Thus the students had to determine which characteristics are typical for children and cubs and in what way the outline of a child differs significantly from the outline of an adult.

AA

EISENHABER, R. - SUCKOW, B.
Dünnschichtchromatographie und ihre Anwendung in der Schule (Thin layer chromatography and its use in school)
Biologie in der Schule, 28, 1979, No.5, pp.204-208, 4 figs.

Thin layer chromatography is widely used, since it makes it possible to distinguish colouring agents, amino-acids, saccharids, alkaloids and other substances. The authors first explain the principle of the method (acquiring different layers, placing them on a slide (a fractionation chamber) and provide instructions on how to procede. In conclusion they describe their own experiences with using this method in school.

FH

FARDY, R.W.

Demonstrating Hemostasis with Student-Designed Prothrombin Time Test

The American Biology Teacher, 40, 1978, No.2, pp.120-122, 1 fig., lit.4

The author acquaints the reader with a method for teaching the mechanism of hemostasis (blood coagulation). First he describes the classical theory of hemostasis according to Paul Morawitz. The coagulation of blood takes place in two stages - from prothrombin to thrombin and from fibrinogen to fibrin. Physiology and anatomy students are acquainted with the mechanism of coagulation. They have the opportunity to combine the symtomatology of coagulation with its etiological roots and possibly also methods of therapy. The article describes methods of coagulation measurements designed by two biology students. The methodology is described in detail: it uses a 3.8 % sodium citrate or 0.1 M of sodium oxalate. The procedure usually requires classical centrifugation, but on the basis of the new method this can be replaced by a change in the concentration of the anticoagulation substance.

hA

GARCIA, R. - McFELEY, J.C.
Determining the Cellular Concentration and Osmotic Potential of Plant Tissues
The American Biology Teacher, 40, 1978, No.2, pp.119-120.
2 figs., 1 tab., lit. 1.

One of the most important problems of living organisms is maintaining water equilibrium. It is sometimes difficult to demonstrate to students the influence of water upon cells. The author describes an experiment in which pupils follow the behaviour of cells placed in a non-isotonic environment. A number of saccharid solutions are used with concentrations from 0.1 M to 1.0 M (with regular decreases of 0.1 M), and a control solution of distilled water. A 1 mm thick layer of potatoe tubers, the roots of carrots or other root vegetables can serve as tissue for observation. The author describes in detail how to proceed. The weight of the specimen is measured before immersion into a solution and after leaching for a period of 12 - 14 hours. Data is noted in tables and also serves to draw up graphical representations. The pupils should be able to draw their own conslusions on the basis of this data.

RA

GÖNNER, M.
Modelversuche zur Ruhespannung an Neuriten (Model experiments with rest potential in nerve cells)
Der mathematische und naturwissenschaftliche Unterricht, 32, 1979, No.2, pp.103-105, 4 figs.

The rest potential of nerve cells is in fact a phenomenon pertaining to an important activity of biological membranes in relation to surrounding ions. Understanding this process is an important assumption for understanding the action potential of nerve cells. Often pupils do not understand the whole problem because they do not have the necessary knowledge in electro-chemistry, physics and chemistry; i.e. they do not understand the physical and chemical causes of membrane potentials. The experiments described serve to facilitate an understanding of these phenomena. The author describes an experiment with diffusion potential, a model experiment with rest tension, and a model experiment concerning the ion theory of rest potentials.

AA

GOTTLIEB, S.F.
Isosmotic and Isotonic Are Not the Same
The American Biology Teacher, 40, 1978, No.5, pp.321-323. lit. 13.

The author explains the difference between the terms isosmotic and isotonic solutions. This difference is very important for future medical students, because in anatomy and physiology textbooks both terms are often identified. Griffith's definition of an isotonic solution is cited and compared to the term osmotic pressure. However, this comparison does not take into account the permeability of membranes. The author provides a clarification of the problem on the basis of the example of a solution of NaCl. In contrast to osmolarity, which is determined by the relative concentration of the dissolved substance, tonicity is determined by the relative concentration of non-permeable substances. An experiment with human or canine blood cells is described, where a drop of blood is mixed with various concentrations of NaCl, glucose and urea.

hA

GUILLARD, C.E.

Utilisation du milieu local (The utilisation of the local environment)

Biologie, Géologie, 66, 1979, No.2, pp.225-228, 2 figs.

By the local environment the author has in mind for instance a classroom, where an aquarium has been installed and where it is possible to observe small shrimps (Caridina desmaresti) which under certain conditions can be bred the whole year. What is needed is the correct organisation of the aquarium, the use of river water, correct temperature and plants. In the experiment, the behaviour of the shrimps is observed under various conditions (light, semi-darkness, turbulent water), various feeding and in experiments in which the shrimp changes its protective colouring.

LR

HILLEN, W.

Reizphysiologische Versuche am Pantoffeltierchen. Eine Unterrichtseinheit für die Klassenstufe 7/8 (Experiments with the physiology of stimulation in a paramecium. A teaching unit for the 7th and 8th classes)

Naturwissenschaften im Unterricht-Biologie, 27, 1979, No. 9, pp.257-269, 1 fig.

The topic devoted to the paramecium is divided into five teaching lessons. The author stresses the importance of experiments. He suggests experiments for the whole class, for pairs of pupils and for groups of pupils. The experiments are derived from the pupils experiences, they are included into problem teaching and contain a testing period, to assure the pupils' interest. The experiments are prepared by the teacher and then undertaken individually by each pupil, the course of the experiment is observed, the outcome is fixated and then assessed by the whole class on the blackboard or with the aid of a projector. The pupils also take notes on the course of the experiment. The experiments concern the stimulation of the paramecium by chemicals (crystals of salt), their reaction to tactile impulses (with a piece of filtration paper, a piece of glass) and their reaction to heat.

AA

JÄKEL, U.

Plasmolyse im Schülerexperiment am Beispiel der Grünalge Cladophora fracta (Plasmolysis in pupils' experiments on the example of the green algae Cladophora fracta)

Der Biologieunterricht, 15, 1979, No.4, pp.68-73, 1 tab ., 8 microphotos.

Usually some plants, such as Rheo discolor and Allium cepa or the Braunschweig red variety of onions are used in experiments done by pupils on plasmolysis. Only a small number of suitable objects are available. The author suggest enlarging the number of objects used in this important experiment. He suggests the green algae Cladophora, especially the specie Cladophora fracta, which is easily available in nature all year. The algae can easily be cultivated in an aquarium for indefinite periods of time and is thus always available. Algae has relatively large cells (40-110 m) and the object can be observed as a whole in a very short time. Procedures are the same as in classical experiments, a hypertonic or hypotonic environment can be achieved with a solution of sodium chloride or sugar. The pupils can observe the growth and diminishing in size of the vacuoles in cells and the protoplasts on the cell wall or near it. These observations are done under a microscope. The course of the plasmolysis can be drawn in notebooks.

AA

JANTZEN, P.G.

Investigating Factors that Affect Dissolved Oxygen Concentration in Water

The American Biology Teacher, 40, 1978, No.6, pp.346-352, 11 figs., 3 tabs., lit. 12.

Organisms which live permanently in water depend on a number of factors, which influence the concentration of oxygen in water. The article describes a number of experiments, by which it is possible to demonstrate some of these factors in school. First the students must understand the difference between molecular (O_2) and bonded (H_2O) oxygen. The behaviour of fish in water which has been saturated or is unsaturated with aerial oxygen is observed. This experiment also demonstrates the difference between the diffusion of oxygen in water and forced-in oxygen (for instance by the wind). The students learn to determine the concentration of oxygen in water - the experiment is described in detail. In other excercises the students observe the influence of the temperature of water, of light, they determine the presence of reduction ions, measure the various temperature layers of the water, the influence of atmospheric pressure, etc.

RA

KADURINA, E. - MILUSHEVA, E. - GEORGIYEVA, P.
Samostayatelnata rabota na uchenitsite pri uroke "Gribnachen mozk" (Independent assignments for pupils on the topic "The Spinal Cord").
Biologiya i khimiya, 22, 1979, No.2, pp.44-47, 2 tabs.

The topic "The Nervous System" is of great educational and teaching value. It provides material for developing the principles of biological thinking, such as the material foundation of life processes, the unity between the organism and the environment, the specific aspects of the higher nervous system, etc. From this point of view the first lesson of the topic, called "The Spinal Cord", is of special importance. Experiments with a decapitated frog can contribute to a materialistic understanding of living substances. Problem questions should be formulated in the following manner: "What causes the complex movements of a frog whose brain has been taken away ?" The pupils should themselves formulate a hypothesis which is then verified on the basis of written assignments given to groups. Findings should be summed up in tables.

LR

KAFKA, J., MÜLLER, K.
Znečištění vzduchu a jeho jednoduché experimentální důkazy (Air pollution and its simple experimental proof)
Přírodní vědy ve škole, 30, 1978/79, No.1, pp.lo/12, 2 figs., 1 tab.

The article describes two experiments which prove the pollution of air. The first deals with the influence of an inversion layer in the spreading of polluted air and the development of smog, the second determines solid particles which contaminate the air.

The experiments are divided into a theoretical part which clarifies some principle, the experiment proper with precise instructions for work and an assessment part, which sums up the outcome of the experiment.

VČ

KLEE, R. - ERBER, D.
Schülerexperimente zur Kälteresistenz von Pflanzen - Physiologische Deutung phänomenologischer Befunde
(School experiments with the chill resistance of plants- the physiological significance of a phenomenological discovery)
Der mathematische und Naturwissenschaftliche Unterricht, 32 1979, No.6, pp.361-366, 3 fig.

On the basis of simple methods and means (a refrigerator and/or a cooling mixture made of salt and ice) it is possible to demonstrate differences among plants in their resistence to chill. Some plants are resistant to frost, while others are not. The author cites a number of suitable plants for cool conditions - for instance the kidney bean or nettle, in contrast to ivy or turnips. In this manner, observations in nature are supplemented by laboratory observations. The resistence of plants towards frost depends on the resistence of cellular membranes, which can be measured and also the distribution of cellular colouring agents. Experiments can be carried out at temperatures of 2 - 4 °C in a refrigerator, at 0 °C in a refrigerator, at -8 - -10 °C in a cooling mixture or refrigerator, at -18 - -20 °C in a cooling mixture, and for control purposes also at temperatures of +20 - 22 °C.

AA

KLEE, R. - ERBER, D. - PUNG, H.

Vegetation verhindert Bodenerosion - Schülerversuch für die Klassen 5/6 (Vegetation prevents soil erosion - an experiment for pupils in the 5th and 6th class)

Der mathematische und naturwissenschaftliche Unterricht, 32, 1979, No.4, pp.231-237, 5 figs.

On the basis of a simple irrigation fixture it is possible to demonstrate and experimentally prove that vegetation protects the soil against erosion. As a control, soil which does not have vegetation on it, was measured. The experiments demonstrate the importance of roots for the soil, and also as an erosion prevention factor. In the experiment the author used a number of plants, which were cultivated in plastic pots some time before the experiment was carried out.

AA

LANGHANKE, W.D.

Experimente zur klassischen und instrumentallen Konditionierung (Experiments with classical and instrumental conditioning)

Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.2, pp.54-57, 1 worksheet.

The classical conditioning of animals (as well as humans) is well known on the basis of Pavlov's experiments. It is based on a combination of conditioned and un-conditioned reflexes. Instrumental conditioning differs from this because the animal, on the basis of a need (hunger, thirst), manifests spontaneous activity connected with specific behaviour patterns. Reward strengthens and later also conditions the repetition of acquired behaviour. On the basis of explaining both types of conditioning the pupil is asked to use the accompanying worksheet which concerns the behaviour of dogs, guppy fish and also associative behaviour in man.

AA

LANGHANKE, W.D.
Experimente zur klassischen und instrumentellen Konditionierung (Experiments with classical and instrumental conditioning)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.3, pp.70-73, 1 fig., 1 worksheet, 2 surveys of lessons.

The author describes in detail the course of two teaching lessons where he deals with the terms classical and instrumental conditioning. Both lessons are based on demonstrations and experiments done by pupils with white mice. One experiment has a hungry mouse which is given a ball of food when entering a special area.

AA

MARCHIONI, W.
Animal Behaviour Investigations for High School Students
The American Biology Teacher, 40, 1978, No.8, pp.487-490, 496. 7 figs.

The author describes several experiments concerning animal behaviour (ethology), which can be carried out in class with simple material and available animals. In the introduction, the author acquaints the reader with the structure of ethology lectures held at the Montclaire High School (in New Jersey) and then deals in greater detail with individual topics. The first of these are spiders, especially tarantula. They are suitable for the observation of copulation behaviour, care of eggs, the growth and development of the young. Another animal suitable for ethological experiments are fish. The article describes experiments with Angelfish. Birds are best suited for the purpose of experiments with imprinting and conditioning and for demonstrations of reproductive behaviour. Imprinting is best demonstrated on young ducklings and other types of free-foraging fowl. Behaviour during mating and nesting can be observed on the turtle- dove. The final group of experimental animals discussed are mammals, especially laboratory rats. They are best suited for observations and experiments with conditioning. In conclusion the author discusses the demonstration of in-born fear of falling from a high place in ducklings, mice, chickens and rats.

RA

MENZEL, G. - KLUGE, S.
Mikrobiologische Langzeit-Experimente (Long-term micro-biological experiments)
Biologie in der Schule, 28, 1979, No.6, pp.247-255. 3 figs., 1 tab.

Teachers usually prefere short-term experiments because they make it possible to rapidly obtain findings. However, long-term experiments make it possible to gain specific findings and moreover they educate pupils towards perseverance and train their observation abilities, etc. They are of course more demanding, especially from the point of view of time. The authors describe three long-term experiments: the degradation of urea by micro-organisms found in the soil, disease of brassicae plants caused by an attack of the Plasmodiophora brassicae mold and the stages of development of claviceps purpura on grain.

FH

MÜLLER, A.

Experimente zur Atmung an lebenden Tieren
(Experiments with the respiration of living animals)
Biologie in der Schule, 28, 1979, No.7/8, pp.307-311.
2 tabs.

The author describes experiments with animals which can easily be obtained and are cheap, which do not require too much space and which do not pose a health hazard for pupils. Among them are the hamster, mealworm, fruit fly and guppy fish. The author concentrates on the hamster and mealworm and cites experiments which are suitable especially for extra-curricula and hobby club activities. They include the following: a qualitative proof of respiration, quantitative measurement of oxygen consumption, the influence of the temperature of the environment on respiration and its intensity. For each experiment the author cites questions, describes preparations for the experiment, objects, instruments and chemicals needed, the course of the experiment and/or observation, its findings and assessment.

FH

MÜLLER, A.

Experimente zur Atmung an lebenden Tieren (Experiments with the respiration of living animals)
Biologie in der Schule, 28, 1979, No.9, p.379, 3 figs.

This article contains pictures and descriptions of experiments which have been described in a previous

214

issue of the journal (No.7/8, pp.307-311). For technical reasons these pictures were not included with the text concerning individual experiments.

ZH

NOVÁK, J. - NOVÁKOVÁ, H.

Demonstrace barevných kapkových reakcí jako úvod do chemotaxonomie rostlin (A demonstration of colour drop reactions as an introduction to the chemo-taxanomy of plants)

Přírodní vědy ve škole, 30, 1978/79, No.8, pp.283-285

In view of the opportunities and possibilities provided by teaching, a seminar on botany in secondary school can also include experiments using the method of latex colour drop reactions on some species of the genus Papaver L. These reactions serve to distinguish the composition of the alkaloid spectrum of lactone, which forms the basis for chemo-taxonomic classification.

Proof of the presence of alkaloids in some of the species of the papaveraceae can be obtained by using the following reagents:

a) a solution of two drops of formaline in 10 ml of concentrated sulpheric acid, which in the presence of morphine produces a dark red colour and in the presence of codeine a purple colour.

b) to 2 ml of concentrated sulphuric acid, 10 drops of a solution composed of 10 drops of 30 % nitric acid and 100 ml of water are added; in the presence of morphine a yellow colour is produced and in the presence of codeine a bronish-yellow colour is produced.

c) an iodine water solution will colour blue in the presence of narceine.

d) a solution of three drops of diluted hydrochloric acid and 5 drops of potassium hexacynoferrite yields a lemon yellow precipitation in the presence of papaverine.

VČ

PFEIL, H.

Heu kann sich selbst entzünden (Hay can ignite itself)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.9, pp.269-270

Self-ignition of hay may occur if it has not been dried properly before being stacked or after prolonged rain on haystacks. If hay contains more than 20 % water and is stacked, self-ignition can occur. Bacteria and fungi contribute to the process of self-ignition. 1 gram of hay contains approximately 2 500 bacteria and fungi germs. The respiration of plant cells ceases at 38 °C and bacteria at 72 °C; chemical decomposition produces further heat when chemical substances are decomposed to carbon dioxide and water, when steam is unable to escape, condenses and contributes to fermentation (at 80 - 90 °C). With a lack of oxygen the temperature of the hay can rise to 300 °C and the hay ignites itself. At present in rainy weather hay is dried artificially. The author describes an experiment with moist hay placed in a zinc or tin vessel where temperatures are measured daily, the smell of the hay and changes in its colour are observed and dry hay is used as a control.

AA

PFEIL, H.
Über die Bedeutung der Mikroflora des Bodens (On the importance of micro-flora in the soil)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.6, p.166.

The author demonstrates the importance of micro-flora in the soil on the basis of an interesting experiment with the use of a pure soil fungi culture (for instance Edafil, from the firm Helena-Chemie, Brackwede), which decomposes cardboard. Pieces of paper cardboard and pieces of a PVC wrapping sterilized by ethanol are kept at temperatures of 105 °C for three days. Then they are placed in an conical flask in a larger plastic vessel which has water on its bottom to provide poisture for the fungi. After several weeks the soil fungi penetrate the cardboard and PVC pieces and decompose them. These micro-organisms are very important for the decomposition of cellulose and for returning carbon dioxide into the atmosphere for photosynthesis.

AA

PFISTERER, J.
Schulversuche mit dem Paradiesfisch (Macropodus opercularis) zur Erarbeitung teritorialen Verhaltens
(School experiments with the Paradise fish (Macropodus opercularis) to demonstrate territorial behaviour)
Der mathematische und naturwissenschaftliche Unterricht, 32, 1979, No.6, pp.353-361.

Adult males of the Paradise fish have marked territorial behaviour. In a school of fish, hierarchy is determined by mutual fights, the outcome of which determines the status of a male fish. The lower placed males demonstrate devotion towards the victors, show them their underbelly, shake in fear, change colour - as initially females do during courting - while the initial courting behaviour of the males is to make an impression. When a dummy fish is used, adult males after a period of making an impression for as long as twenty to sixty minutes have a tendency to run away. Fishes of a different specie are indifferent to the male and their behaviour is inadequate when the male is making an impression. Young male Paradise fish or females behave either subserviently or aggressively, but they lack the most important signs of territorial behaviour - endeavors to prevent aggressiveness on the part of others, letting the defeated rival go, combat and escape behaviour towards a rival of the same strength (a dummy in a mirror) and the fight itself. The author describes in detail, for the purpose of school experiments, the behaviour of the Paradise fish in schools, the agonistical behaviour of the male, behaviour after stimulation and the behaviour of males and females during courtship, as well as behaviour towards fish of a different specie. Also problems connected with the keeping of Paradise fish are discussed.

AA

RAETHER, W.
Formen des Verhaltens beim Südafrikanischen Krallenfrosch Xenopus laevis Daudin und ihre unterrichtliche Bearbeitung (Behavioural patterns of the South African water frog Xenopus laevis DAUDIN and their teaching in school)
Der Biologieunterricht, 15, 1979, No.4, pp.8-24, 10 figs., 3 worksheets.

The African frog Xenopus laevis DAUDIN is a suitable object for ethological observations in school.

It is fairly easy to keep, it can be acquired cheaply and experiments can be carried out on a long-term basis or within the framework of a single experimental period. The author describes various forms of the behaviour of this frog in an aquarium (with drawings), how it should be recorded and used in ethological assignments in class. Also problems connected with the keeping of the frog in school are discussed.

AA

SENNKE, A. - WAGNER, C.
Reizbewegungen bei Mimosa pudica (The stimulation of movement in Mimosa pudica)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.2, pp.45-50, 8 figs.

The authors describe the use of the Sensitive plant (Mimosa pudica) in biology teaching. A number of very interesting experimente are described, which were carried out at the Botanical Gardens in Munich - Nymphenburg and which include the reaction of a leaf to stimulation without the reaction of the leaf petiole, the reaction of the leaf and petiole, the reaction of a leaf to wounding, observations of the course of stimulation, the mediation of the stimulus and the speed of reaction when the end leaf is cut off, as well as the mediating period of latency and refraction. Nastic movements depend on the specie in question and the direction of the stimulation. The organs of movement in Mimosa pudica are the joints of primary and secondary leaf petioles and compound leaves. Their dorso-ventral structure is distinguished by different cells on the upper and under side of the leaf which make movement possible. The organs for receiving the stimulus are probably the sensitive flagella on the underside of the leaf scar. Stimulus is provided by changes in the special sensitive cells which are found in the membrane (on the basis of selective ion permeability). The stimulus travels usually at the speed of 3 to 5 mm/sec. The action potential (electrical current) probably goes through plasma links (plasmodesmata) into adjacent cells where a depolarisation of the membrane takes place. The stimulus is supported by the transportation of the stimulating substance (probably some oxygen containing acid) into the conductive passages (xylem and phloem); for this reason the stimulus is rapidly generated for long distances. The author does not explain whether this substance directly causes the stimulation or only lowers the stimulation threshold of the conductive cells.

AA

SCHAAP, R.
"Lernen bei Tieren" - Experimente im Biologieunterricht der Orientierungsstufe ("Learning from Animals" - experiments in biology teaching in secondary school)
Biologieunterricht, 15, 1979, No.1, pp.5-25.

The author recommends the use of a stunted variety of the domestic rabbit and white domestic mice for demonstrations of how man can learn from animals. Both animals can serve to demonstrate learned and inborn behaviour. The experiments study the influence of the environment, stimulation, the course and outcome of learning and the adaptation of animals to new living conditions. The pupils themselves can add information gained at the circus and zoo, which can also be visited as excursions. The author divides this topic into four teaching lessons, in which experiments with conditioned reflexes and with feeding are carried out, as well as with a labyrinth, with cleaning the animals' cages and the training of males by a method of trial and error. Individual lessons are described in detail, as well as specific aspects of rabbit and mouse behaviour and the use of classical conditioning by rewards and punishements.

AA

SCHOLLHAMMER, P. - BONNEFOI, R.
Action de la temperature sur le rythme cardiaque de la grénouille (The influence of temperature on the heartbeat of a frog)
Biologie, Géologie, 66, 1979, No.2, pp.229-235, 4 figs.

The authors describe and provide pictures of a simple apparatus, which pupils themselves can make, and with the help of which it is possible to follow the heartbeat of a frog in temperatures from 5 °C up to 33 °C. Heart pulse can also be studied with the aid of a projector. The outcome are interesting curves, which make it possible to draw various conclusions.

LR

SCHRÖPFER, R.
Die Mongolische Rennmaus (Meriones unguiculatus) im ethologischen Experiment (The gerbil (Meriones unguiculatus) in an ethology experiment)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.6, pp.141-153, 8 figs., 2 tabs.

The author describes the behaviour of the gerbil in schools and the opportunity this modern experimental animal provides for experiments in ethology. The necessary vessels and other facilities for keeping the gerbil are described, as well as possibility of using young animals in experiments together with their older siblings and adult males and females. Experiments with localised contacts with the vessel wall (a type of haptotropism), with the speed of orientation towards a board with the olifactory secretion of an abdominal gland and an experiment to verify marking by testosterone are described. The author also describes observations for the making of an ethogram concerning the general behaviour of the gerbil. The work is attractive for pupils and can be carried out in groups.

AA

SCHWARZENBACH, A.M.

Simulation der Sonnenbahnen im Mini-Planetarium zum Untersuchung des Vogelzuges (The simulation of the path of the sun in a mini-planetarium for the study of the seasonal migration of birds)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.7, pp.174-179, 9 figs.

The article continues in providing instructions for the making of a mini-planetarium (cf. issue No. 6, 1979, of the same journal) and for demonstrating the path of the Sun at any time of the year. On the basis of Kramer's and Matthew's experiments, it has been found that birds during their migration during the day or partially during the day and partially at night-time find their way according to the position of the Sun in the sky. Birds who migrate only at night-time find their way according to the position of the stars and the visibility of the Sun at sunset. In models of migratory movements the position of the Sun in the mini-planetarium is decisive. The author describes the migration of the White Stork, the Arctic Tern (Sterna paradisaea) which flies from the Canadian arctic regions over Western Europe to Africa and the Antarctic , the Shearwater (Puffinus tenuirostris) which flies from

Tasmania through Japan, Alaska, California and the Cook Islands back to Tasmania, and the Plover (Pluvialis socialis) which flies from Tierra del Fuego to Peru, as well as the Wheatear, which flies from Alaska over the Behring Strait to Siberia, Southern Russia, Syria, Egypt and Central Africa. During its flight this bird goes through approximately 12 time zones ! During their flight the birds mark time by an internal clock. In a southern direction of flight the bird subtracts from the position of the Sun and uses a correction factor. Also whales, fish and insects which undertake migratory seasonal movements, find their way according to the position of the Sun.

AA

SPOHR, P.

Chrysomela varians Schall - genetický model pro školní pokusy (The leaf beetle(Chrysomela varians Schall)- a genetic model for school experiments)
Přírodní vědy ve škole, 30, 1978/79, No.3, pp.88-90, 2 figs.

The author of the article describes a suitable genetic model - the leaf beetle Chrysomela varians Schall, which is widespread on Saint-John's-wort plants (Hypericum perforatum L.)

The beetle and their larvae can be found on the plant since the middle of May; their development takes from six to seven weeks. For carrying out genetic experiments it is important to be able to distinguish males and females. The females are larger than the males and moreover on their abdominal side in the middle of the last segment there is small concave indention. Beetles found outdoors cannot be used for cross-breeding because the females may already be fertilized. The experiment can be carried out when at least three to five pairs of beetles are available, which have been bred in school. Blue, copper red and green are the hereditary colours of this bug which are transmitted according to Mendel's laws. Blue and copper red beetles are homozygotic. When blue and red individuals are mutually cross-bred, the F_1 generation will yield only green coloured bugs, which is in accord with Mendel's rule of uniformity in the F_1 generation. An advantage of these experiments is the relatively short time they require, because from catching the beetles outdoors up to the hatching of the images of the F_2 generation no more than three months are needed. Moreover, the experiment can be organised at a time when the topic on heredity is to be taught.

vd

STARKE, K. - WESTERHAUSEN, M.

Hormonphysiologische Versuche an Insekten, Teil II

(Hormonal and physiological experiments with insects - Part II)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.1, pp.1-13, 2 tabs., 5 worksheets.

The first part of this article was published in issue No. 3, vol. 26. In 1954 Butenandt and Karlson were able to isolate an ecdysis hormone from the pupa of the silk worm (Bombyx mori) which was named ecdysone. In 1964 Nakanishi et al. obtained from Podocarpus nakii four different compounds which were proven to be active in the Calliphora test. In 1965 Takameo et al. found in the roots of the plant Achyranthes fauriei two substances which cause molting activity and are crystalline: inokosteron and its isomer, iso-inokosteron, which was found to be identical with ecdysterone. This phytoecdysone was also found in several other plants. The author stresses the similarity of these substances in their structural formulas. He also discusses the chemical properties and chemical tests for molting hormones and cites experiments with injecting plant extracts which have an ecdysis (or moulting) effect, into the larvae of the Calliphora fly (the so-called Calliphora test). Also experiments with feeding ecdysone to fruit fly strains are described: "ebony" strains moult approximately half a day earlier than controls and take on a dark colouration one day earlier. Other possible experiments are described with moulting hormones which can be used in pest control.

AA

STEBBINS, R.C. - BROCKENBROUGH, A.
Schulversuche zur Evolution - Simulation der natürlichen Auslese (School experiments with evolution - simulation of natural selection)
Der mathematische und naturwissenschaftliche Unterricht, 32, 1979, No.1, pp.37-44. 1 fig.

Natural selection in evolution is an important subject in contemporary biology. To understand this problem is not very simple for various reasons. In the described and often repeated excercises the pupils are able to achieve an understanding of the influence of simulated selection upon a specific population. The material required can be made in school or easily acquired. The basic experiment provides material for further experiments which concern adaptive radiation, the founding principle, changes in the ability to see among predators, positive and negative selection, mutation, sexual reproduction and selection among predators. The application of the laws of evolution upon simulated experiments leads to a good understanding of the basic principles of evolution.

AA

STEPHAN, B.

Schülerversuche zum Nachweis von Farbsehen bei Blatläusen nach prof. Moericke (Experiments for pupils to prove the colour sight of plant lice, according to prof. Moericke)

Der Biologieunterricht, 15, 1979, No.4, pp.5-7.

The author carried out experiments concerning the physiology of sight in plant lice. Essentially, these experiments are similar to those carried out by Frisch with the colour sight of bees. The pupils first cut out 50 cm long strips of paper which were 3 cm wide and on one side they painted 2 cm. stripes of black, white, red, blue, yellow and green. The ends of a paper strip are pasted together so that the colours were on the inside. With the help of a brush, the plant lice were placed into the ring and observed. The colours they crawled to were recorded. The paper used was white before the stripes were painted and the experiment was carried out in daylight. The number of lice which crawled to individual colours were recorded and the data statistically processed. It was found that the colour yellow predominated in preference over all others. Plant lice are phytophagous and thus prefers green and yellow. Yellow is more attractive for them, and thus demonstrates more than optimum excitation. This knowledge can be used for catching plant lice and saving contaminated cultures. The plant lice can be caught into a yellow vessel filled with water.

AA

STORRER, J.

Der Pulfrich Effect: Demonstration und neuronale Deutung dieser optischen Täuschung (The Pulfrich effect: a demonstration and explanation of the neurone significance of this optical delusion)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.9, pp.241-245.

The author provides information on the Pulfrich effect, its demonstration in biology class and the neurone significance of this optical delusion. The effect was discovered by Carl Pulfrich , in spite of the fact that he himself never saw the effect, because he was blind in one eye. He described the effect in 1922. To see the effect, requires the use of both eyes (the use of a stereo-comperator).

It can be demonstrated with the aid of a tripod, a thread, a small ball for use as a pendulum in front of a light, and an optically homogenous wall. The ball is hung from two 1 meter long threads. When observed with both eyes, we see a normal pendulum movement of the ball. If, however, one eye is covered with a grey filter and the pendulum is observed by both eyes, we see the movement of the pendulum on an eliptical path. The author explains the cause of this optical delusion, which is the result of a mechanism in the central nervous system. The effect can easily be shown in class, but should also be properly explained.

AA

THEISS-SEUBERLING, H.
Chloroplastendifferenzierung in Euglena gracilis - Ein einfacher entwicklungsphysiologischer Schulversuch für die Sekundarstufe I und II. (The differentiation of chloroplasts in Euglena gracilis - a simple school experiment in developmental physiology for secondary school)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.10, pp.268-272.

The author describes an interesting experiment with the strain Euglena gracilis, which, when it is kept in the dark, in a suitable cultivating medium, loses its chloroplasts and lives heterotrophically, as an animal. After seven generations of acquiring food heterotrophically in the absolute dark, Euglena gracilis (which multiplies very quickly) loses the ability to form chloroplasts and to synthesize chlorophyll. When it is returned to daylight, the eyesores rapidly become green again and form the proplastids of chloroplasts; they begin to synthesize chlorophyll again and rapidly become autotrophic organisms.

AA

THIESSEN, H.
Untersuchungen und Versuche am Schweineherzen
(Observations and experiments with the heart of the domestic pig)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.2, pp.51-53, 2 figs.

In learning about the structure and function of the human heart the author recommends the use of commercially acquired hearts of the domestic pig for observations and experiments. The external study of the heart can be carried out on a pig's heart, as well as observations of the function of the heart, its insides, how the heart is supplied with blood from the coronary artery, the structure and function of the valves. The heart of a pig is approximately of the same size as a human heart. The experiments are described in detail.

AA

VELICHEVA, Z.M.
Botanicheskiye opiti v ugolku zhivoy prirodi
(Experiments in botany in a living nature room)
Biologiya v shkole, 53, 1979, No.6, pp.55-56.

Every school has its indoor plants, which can be used for expriments in biology teaching in the 5th and 6th classes. The author describes experiments which are suitable for the following topics: Vegetative propagation (3 experiments), the influence of various conditions upon the growth and development of plants (5 experiments), the evaporation of water by leaves (1 experiment), conditions for the germination of seeds (1 experiment), the structure of lichens (1 experiment).

FH

WILMES, A. - GROHTE, H.-W.
Muskel aus der Spritze (Muscles from injections)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.11, pp.288-291, 6 figs.

The author describes two model experiments, which make it possible to demonstrate bio-chemical processes which take place when a muscle is contracted. A muscle as a functional unit and its composition are discussed. Actin fibres slide between myosin fibres, without both types of fibres becoming shorter. The author discusses in detail the interface between these two types of fibres, which together form the molecular structure of the muscle.

AA

WITTE, J.
Eine einfache Apparatur zur Untersuchung von Kondensat im Tabakrauch (A simple apparatus for the study of condensates in tobacco smoke)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.8, p.215, 1 fig.

The author suggests the construction of simple apparatus for obtaining the condensate of tobacco smoke for use in teaching the topic "Smoking". The apparatus is composed of a bicycle pump with an up-side-down leather sleeve (so that it serves as a suction pump), the front part of which has been cut off and its orfice is filled with rubber plug. A 20-25 cm glass tube is placed into the plug and filled with crystals of ordinary salt, and closed at both ends with pieces of cotton-wool. With the aid of a rubber tube, a cigarette holder is fastened to the glass tube. With this apparatus it is possible to test various brands of cigarettes, cigarettes with a filter and hard and soft cigarettes to see the amount of nicotine which their condensates contain.

AA

YOUNGGREN, N.A. - HADLEY, M.E.
Hormone Action: Oxytocin-induced In vitro Milk Release
The American Biology Teacher, 40, 1978, No.7, pp.410-413, 422, 7 figs.

The article describes an experiment, which during excercises in physiology demonstrates to students the effects of oxytocin upon lactic glands. First the authors provide a general survey of the function of oxytocin as a hormone, its effect on the production of milk and its role in the reproductive physiology of mammals. They also mention the anatomy and function of the lactic glands and describe the whole lactation process as a neuro-endocrine relation existing between the lactic glands and the brain. In the next part of the article the authors then describe the experiment itself: the necessary material, its preparation, the methodology of the experiment and comments on the anatomy of the experimental animals (in this case mice), the quantitative aspects of hormonal activity and a specification of the neurones and hormones produced by the pitituary gland. The authors describe two experiments with the lactic glands of mice in vitro. In the first, a piece of tissue is submerged into a Ringer solution to which a solution with oxytocine is added by drops. In the second experiment, a piece of tissue is placed into a Krebs-Ringer solution to which a solution with a low oxytocine content has been added.

RA

9.9 Methods of strengthening, excercizing and assessing what has been learnt

SCHUBERT, F.

Über Möglichkeiten des systematischen Wiederholens

(On opportunities for systematic repetition)

Biologie in der Schule, 28, 1979, No.12, pp.515-516.

Every teacher knows the difficult situation, where the pupil manifests a gross discrepancy between his endeavours and real knowledge. The author deals with this contradiction by the repetition of previously acquired knowledge. Repetitions should indicate if there is any relation between what has been learnt previously and what is being taught now. The teacher can plan the lesson with the aid of cards, which are described in detail.

FH

10. Teaching media for biology

GAC, T.

Nowe pomoce dydakyczne (New didactical aids)

Biologia w szkole, 32, 1979, No.4, pp.177-180, 5 photos.

A national enterprise for making school aids in Warsaw has prepared new aids. For biology these include specimens mounted in synthetic resins (the heart of a vertebrate, the kidney of a lamb, gills and gill covers of a fish, the anatomy of a shellfish, the dentition of a fox, a rabbit, the extremities of a lobster, a crayfish, a longitudinal cut through the brain of a mammal (of a cat and rabbit), the development stages of insects of the Colorado potatoe bug, a collection of mosses, the development and polymorfism of the bee, the composite stomach of cattle, the skeleton of a frog, the skulls of vertebrates, the sexual dimorphism of insects, the skeleton of a mouse, the developmental stages of a fish, the propagation of conifers, a collection of lichens, sheep liver fluke, the anatomy of the tench, the development of the fish and the frog (a foliogram and phasegram), various levels of life in a forest, the anatomy of plants and the structure of plants - their parts above and below the ground, slides on the topic of the adaptation of plants and animals in fresh water, the flora and fauna of the steppe and the desert, the variety of aquatic environments. Other aids are available to schools for breeding aquatic fauna (including hearing elements, illumination, aeriation apparatus, etc. for aquariums).

AA

10.24 Aquariums, mini-aquariums, terrariums, aquaterrariums and marine aquariums

CLARK, T.K.

Terrariums: Heightening Student Interest in Botany

The American Biology Teacher, 40, 1978, No.1, pp.49-50

The author cites his experience with the use of terrariums in teaching botany. He sums up in ten points some of the principles for the successful founding of a terrarium. The vessel should be made of transparent material and be very clean. The size of the vessel depends on the size and number of fauna which will be kept in the terrarium. The students should have the necessary facilities made available to them. The soil used in a terrarium should be sterilized. An average sized terrarium should have three smaller sized plants. How the plants should be planted and the finishing of the terrarium are described.

RA

SKOWROŃSKI, Z.

Akwaria morskie w szkolnej pracowni (A marine aquarium in school)

Biologia w szkole, 32, 1979, No.3, pp.128-132, 3 figs.

The author informs the reader of his experiences with the operation of a marine aquarium at a general education secondary school in the town of Wolsztyn. The aquarium was founded by pupils under his supervision, within the framework of the Biology Olympiad competition. The pupils bred sea anemones and the algae Caulerpa prolifera. The author recommends for this type of aquatium a vessel made of glass, glued together with Apasol E.P. 11 or with Cenusilikon, with a content of 41 litres or 20 litres; in the former, the glass should be 6 mm thick, in the latter, 4 mm thick. The author describes the method of gluing and how to make the sea water for the aquarium with the use of 12 various chemicals. The water for the aquarium should be made every three months by the pupils and should be completely exchanged once every half year. Otherwise only distilled water is added to replace what has evaporated. The bottom of the marine aquarium should have a layer of river sand 1.5 cm thick and should be heated with a thermal element to 20 - 25 $^{\circ}$C. Such an aquarium requires aeriation.

AA

10.26 Animal breeding in schools, breeding facilities.

FISHER, M.F. - LLEWELLYN, G.C.
The Mongolian Gerbil: Natural History, Care and Maintenance
The American Biology Teacher, 40, 1978, No.9, pp.557-560, 2 figs.

The article describes the gerbil which in the USA is best known and most easily accessible - the Mongolian Gerbil (Meriones unguiculatus). The author provides a brief characteristic of the Meriones family and this specie and describes in detail the various uses to which a Mongolian Gerbil can be put within the framework of biology teaching. These animals have served as experimental animals in research concerning tuberculosis, bilharsiasis, in the study of bacterial and viral disease, the metabolism of fats, in genetics, etc. The article also briefly deals with some of the biological aspects of the Mongolian Gerbil living wildly and with its behaviour. The main focus of attention is concentrated on the methodology of its breeding and reproduction in a laboratory. In conclusion the authors discuss its use in class when teaching physiology and eco-systems.

RA

FRINGS, H-J.

Themen und Aufgaben zur Arbeit mit lebenden Gespenstschrecken im Biologieunterricht ab 5. Schuljahr

(Topics and assignments with stick insects in biology teaching in the 5th class)

Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.7, pp.210-223, 10 figs, 4 worksheets.

The author describes various opportunities provided by the stick insect Extatosoma tiaratum, which comes from Australia, for biology teaching in the 5th class. This is a large insect which can easily be acquired, has marked mimetic behaviour for its protection, an incomplete transformation, and developed regeneration. The models which the author describes, as well as the worksheets he provides, can be used in class. The described procedures have been verified in the School Center in Hannover. One of the aims of using live insects in class is to oversome in pupils a fear of insects and the disgust or emotions which insects often evoke. During work with the stick insect, pupils become thoroughly acquainted with the sections of an insect body, they are able to observe various stages of its movement, how it feeds, the stages of its development (from an egg to an imago), the structure of insect wings, the mechanism of its flight and the adaptation of insects both in shape and behaviour to their environment. Observations of and experiments with insects who are capable of regeneration and healing of wounds and methods of breeding larva through their various stages can be taught in the 9th and 10th classes. Extatosoma tiaratum, whose breeding is also described, is shown to be a suitable object for zoology teaching in all types of schools.

AA

KRÓL, T.

Hodowla jedwabników (Breeding silk worms)

Biologie w szkole, 32, 1979, No.3, pp.139-140.

The author informs the reader on how pupils at the basic school in Taśmiennici bred silk worms. This activity does not require too much time and is economically important. In the whole of Poland there are favourable conditions for breeding silk worms. The pupils cultivated a hedge of mulberries 200 meters long, which provided fodder for the worms for a period of 8 years. The silk worms were sent to the school free of charge from the State Institute for Breeding Silk Worms. The project was undertaken by pupils from the 6th and 7th classes. The experiences gained from this project are very positive. Since 1978 cocoons of the silk worm have a market price which has increased by 65 %.

AA

KUBÍČKOVÁ, J.

Příprava nálevů pro pěstování prvoků ve školních podmínkách (The preparation of a broth for the cultivation of protozoa in school conditions)

Přírodní vědy ve škole, 30, 1978/79, No.7, pp.245-248, 5 figs.

The article sums up experiences gained in cultivating protozoa in school. Obtaining a broth rich in protozoa depends above all on the material from which the broth is made, including the water used, its temperature, etc. When making such a broth, its succession should be forseen, i.e. the natural progressive changes in the development of its biocoenosis, which depend on the changing conditions of its life. For this reason any instructions for preparing a broth should first be tested.

The article contains instructions for making the most frequently used broths: hay broth, lettuce broth, broth made of forest humus, from birch leaves and from moss. Also methods of cultivation and types of cultivation media for protozoa which can be used in school are described.

vŏ

KUZA, H.

Wypławki czarne w akwarium (Planaria lugubris in an aquarium)

Biologia w szkole, 32, 1979, No.2, pp.84-85.

Many invertebrates can be successfully cultivated in school. The breeding of invertebrates in aquariums is a suitable project for observations and experiments carried out by pupils. The author recommends the cultivation of Planaria lugubris, which can easily be acquired during outdoor excursions in flowing or still water where it lives on plants or rocks. It can be kept in an aquarium together with water plants and other small invertebrates. In a suitably adjusted aquarium an artificial biocoenosis exists, including producers. Planaria lugubris makes it possible for the teacher to demonstrate movement, feeding, stimulation, cocoons, phototropy and other biological terms.

AA

LLEWELLYN, G.G. - MILLS, R.R. - SHERERTZ, P.C.
A Cage for Studing Cockroaches and Other Insects
The American Biology Teacher, 40, 1978, No.8, pp.498-499,
1 fig.

The article describes the methodology of breeding individual samples of cockroaches, which are sometimes needed for various experiments. The cockroaches are kept in special cages, whose bottom is formed by a Petri dish with a filtration paper, on which rests an up-side-down flower pot made of plastic with holes drilled into it. Methods of keeping the filtration paper moist and providing the insects with water from a glass tube are described. A feed box is attached to the bottom of the flower pot, so that it can easily be taken out and filled. This system prevents the food becoming dirty from the excrements produced by the insects and makes it easier to study the amount of food eaten and the percentage of its utilization by comparing the weight of the food and the weight of the filtration paper on which excrements are found. The whole arrangement is placed in a transparent box with a box top, size 30x16x8 cm. In conclusion, the authors cite other possibilities for using the described cage.

RA

10.2.6.1 Zoological gardens

JUSZCZ, M.
Dzieialność dydaktyczno-popularyzatorska zoo w Warszawie z okazji 50-lecia (The didactical and popularisation activities of the Warsaw zoological gardens at the occasion of its 50th anniversary)
Biologiy w szkole, 32, 1979, No.1, pp.30-32, 1 photo.

The zoological garden in Warsaw was openned in 1928 and in 1978 celebrated the 50th anniversary of its founding. At this occasion it also received a medal from the National Education Commission. The Zoo in Warsaw has various didactical and popularisation functions; especially in the period 1929-1951 the Zoo flourished under the directorship of Dr. Jan Żabiński, a foremost educator, zoologist and writer. Under him, the Zoo integrated its activities with those of basic, secondary vocational (agricultural) and general education secondary schools. During the Nazi occupation he was a member of the secret Warsaw University. At the end of the war he contributed to many radio and later television programs. His work is now being continued. The Zoo now organises various hobby clubs, cooperates with various types of schools, with houses of culture and youth, as well as with foster homes for child care. The staff of the Zoo lecture directly in schools on problems pertaining to keeping an aquarium, on protected reptiles and amphibians, on the influence of the environment on the structure of animal bodies and their way of life, on mammals in various environments, etc. The Zoo also cooperates with students when they are preparing their theses.

AA

10.2.7 Growing plants in schools, growing facilities, school experimental plots of land

BUKHALO, M.A.

Pitomnik dikorastushchikh rasteniyi (A plot for wildly growing plants)

Biologiya v shkole, 53, 1979, No.3, pp.52-53

Then studying the flora of the local region insufficient use is made of the possibility of having a garden bed with specimens of wildly growing flora from the vicinity. The flora cultivated on such a plot need not include only those plants which are described in class, but also those which are characteristic and widespread throughout the region. The flower bed cultivated at the Agrobiological Station at the Tambovsk Pedagogical Faculty can serve as a model of such a flower bed. The flora of the region contains 1261 species belonging to 476 families and 101 genera. The author cites opportunities for finding monocarps and polycarps for this purpose and the organisation of such a flower bed.

FH

DORST, F.W.

Schüler rüsten ihren Schulgarten aus (Pupils contribute to their school gardens)

Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.10, pp.296-297.

The author makes various suggestions for assignments for pupils in the lower classes of basic school, who can help in making feed boxes for birds for the winter, which can be placed in trees found in the school garden. Such feed boxes should have a roof. For squirrels, feed boxes with wheels can be made. For older pupils, the author suggests making a meteorological garden with a ground thermometer, an anemometer, a wind vane and an arrangement for the measurement of precipitation. Thus the school garden can serve for carrying out simple phenological observations.

AA

FEDORIN, A.I.

Nash uchebno-opitniy uchastok i ego rol v vospitanii shkolnikov (Our school experimental plot of land and its role in the education of pupils)

Biologiya v shkole, 53, 1979, No.4, pp.55-58.

The school experimental plot of land in the school where the author is a teacher was founded in 1968. It covers an area of 2.5 hectars and has a number of divisions, where pupils can work the whole year. The pupils have the possibility of chosing for themselves the assignment they wish to work on - from a list contained in the syllabus. The simplest experiments are carried out already by pupils in the first classes. In the 4th to 6th classes the experiments are more complicated (for instance the influence of fertilizers on the development of onions, the influence of leeks on carrots, etc.). Pupils in the 4th to 8th classes learn to carry out experiments in a school production brigade, where the work is done in a group and on a larger scale.

FH

KONESHOVA, Z.P.

Rasmnosheniye sadovogo zhasmina zelenjonimi cherenkami

(The propagation of jasmine by cutting)

Biologiya v shkole, 53, 1979, No.3, p.67.

Jasmine can be propagated by cutting, seeding and by grafting. The cuts should be cut before the shrub blooms, in lengths of one internode, early in the morning. They are then cultivated in a hothouse in 5 cm intervals in rows of 8 - 10 cm, and 2 cm into the soil. The hothouse should be aired every day. Heteroauxine and microelements accelerate growth.

FH

MAGOMEDOVA, A.K.

Kollektsiya rasteniy uchebno-opitnogo uchastka

(A collection of plants for a school experimental plot of land)

Biologiya v shkole, 53, 1979, No.2, p.69

The school experimental plot of land in the school at Kyuryagsk is 0.5 hectars in size. It is divided into several beds and a number of plants are cultivated there which the author describes in detail. The bed devoted to field crops contains not only cereals widespread in the Republic, but also new and less well known varieties. Also garden apples, plums and pears are cultivated. The pupils become acquainted with various methods of propagating plants. Also decorative plants are cultivated.

FH

PETER, K.

Zur Nutzung des Schulgartens - Der echte Mehltan der Gurke (On the utilization of a school garden - cucumber mildew)

Biologie in der Schule, 28, 1979, No.2/3, pp.101-103.
2 figs.

Useful plants are often attacked by various pests. The author first discusses the significance and incidence of moulds from the family Erysiphaceae. In August and September it attacks cucumbers in the form of white spots which change into powdery coatings on the upper and under side of leaves. This pest can be combated by fertilization and by various measures such as the application of chemicals and the cultivation of suitable varieties. From a systematic point of view, these moulds include the class Ascomycetes, the order Perisporiales, the family Erysiphaceae. The cucurbitaceae are hosts to the parasites Erysiphe cichoracearum and Sphaerotheca fuliginea. The author provides various comments on the determination of these moulds (on the basis of the shape of their conidiums), the use of population analysis and various other activities done by pupils (for instance distinguishing two species, the percentage representation of both species in a sample, etc.).

PH

RÄUBER, A. - RÄUBER, H.

Ikebana (Japanese flower arrangements)

Biologie in der Schule, 28, 1979, No.7/8, pp.328-336.
9 figs.

Japanese flower arrangements (called Ikebana in Japanese) are a topic of popular interest in the socialist countries. The authors first explain the term Ikebana, which reaches back to the 6 - 7th century.

In the 16th century it lost its religious and mythological connotation and became an art form. Today, almost 10 % of all Japanese attend Ikebana classes. The authors explain some Ikebana styles (for instance moribana, nage-ire, Shoka) and cite opportunities for including Ikebana into the process of Communist education and into biology teaching. Ikebana can also be used as a topic for hobby clubs.

FH

RODZIEWICZ, J.
Wykorzystanie działki szkolnej w pracy dydaktycznej
(The use of a school plot of land in didactical activities)
Biologia w szkole, 32, 1979, No.1, pp.40-41.

The author provides information on the use of a school plot of land at the basic school in the town of Prabuty. This work is guided by the standards issued by the Ministry of Education in 1968, which define the obligations of the curator of the school plot of land and the principal of the school, the planning and standardisation of the work done there, the topics taught and their methods of documentation. Such plots of land are founded in the close vicinity of basic, secondary agricultural and general education secondary schools. The curator of the plot of land is usually the biology teacher. The principal of the school is responsible for the state and utilisation of the school plot of land for didactical purposes. The plot should be divided into sections for vegetables, for fruit, for trees and shrubs, for samples of field crops, for decorative plants, should have a hothouse and a zootechnical section. Also medicinal and honey producing plants can be cultivated. On the basis of the syllabus from 1974, pupils from the 5th class work on the school plot of land 8 hours and in the sixth class for 6 hours per school year (half of this time in the spring and half in the autumn). Otherwise extra-curricula activity groups and hobby clubs made up of pupils in the 7th and 8th classes work there. The plot of land in Prebuty was founded in 1960, has 2 000 m^2, an alpinium, 200 rose bushes, etc. For each year the author draws up a plan of activities. The work is done in groups. Each group receives a special task, such as for instance observing the influence of fertilization on the potatoe crop, etc. The group keeps records of its activities (the data, description of work, changes observed on plants, harvesting the crop, assessment). The article describes as an example the planting of early cabbage. In 1961-1972 the net income from the school plot of land was 20 000 zlotych. In a competition of school plots of land it obtained a first prize.

AA

SLOBODYAN, I.M.
Virashchivaniye roz na shkolnom uchastke (Cultivating roses on the school plot of land)
Biologiya v shkole, 53, 1979, No.1, p.67.

For ten years the author has been cultivating a variety of rose called Rosa canina L. on the school plot of land. Seeds are planted in rows 1 m apart, with 20 - 25 cm between plants. The author cites a number of technical details connected with cultivating the plants during the summer and winter. The cultivated roses are used in biology teaching.

PH

ZHDANOV, D.A.
Shkolnaya teplitsa (A school hothouse)
Biologiya v shkole, 53, 1979, No.5, pp.43-44, 2 figs.

The pupils of a secondary school in Moscow have for 16 years been taking care of a hothouse. At first their work concentrated on gathering a large collection of various plants and shrubs and later they started experimenting. The hothouse has been divided into various sections for the cultivation of water plants, representatives of various systematic groups of plants, of dicots and monocots, a section is devoted to vegetative propagation, to cactuses and succulent plants, to a variety of leaf shapes and stems. All the plants have been scientifically described. The hothouse described in the article can well serve as a model school hothouse.

FH

10.2.8 Hydropony

DOMKA, L. - FLORYSZAK, J.
Zmodyfikowana metoda prowadzenia kultur wodnych rośtlin
(A modified method of cultivating water plants)
Biologia w szkole, 32, 1979, No.3, pp.117-121, 5 figs., 1 tab.

Original objects used in biology teaching make it possible to include pupils into independent research. A suitable project for such work are water plants and their cultivation, their nutrition, a study of how the plant transports nutrition and other aspects of plant physiology. Experiments with water plants make it possible to prove the presence of macro-elements and microelements in plant nutrition. A lack of some substance can be seen in symptoms of disease which are caused by a shortage of some element. The authors recommend first cultivating plants from seeds, pre-cultivating them, and only then transfering them to a water culture for the purpose of experiments in class. Once in the water, they should be cultivated with artificial illumination, with temperatures of 24 °C and unregulated humidity (the school environment) for a period of three to six weeks. Among the plants suitable for this type of cultivation are white mustrad, kohlrabis (White Ditmar variety), linen, sunflowers, barley, rye, meadow fescue and tomatoes. The authors verified a total of 16 species. They found the best cultivating medium to be Knopp's hydroponic solution. In experiments the pupils observe the symptoms which accompany a lack of N, S, K, Ca, P, Fe, Mg. The experiments can be schortened by cultivating the experimental plants for a certain period in distilled water. Such deprived forms manifest much more quickly the symptoms which accompany a shortage of specific elements.

AA

10.4.3 Dermoplastic specimens, stuffed specimens

ALTMANN, A.
Rychlá a spolehlivá konzervace ptáků (The rapid and reliable preservation of birds)
Přírodní vědy ve škole, 30, 1978/79, No.3, p.94.

Animals can be preserved without the difficulties which accompany their skinning, by soaking the tissues in a saturated solution of so-called formax, which in fact is a mixture of 37 % formaline and a concentrated solution of borax at a ration of 1:1.

With a hypodermic syringe all the tissues of the animal are saturated with the chemical. For 1 kg of animal to be preserved, approximately 200 ml of formax should be used.

VČ

SHERIDAN, P.
Formax Preserved Birds
The American Biology Teacher, 40, 1978, No.1, pp.21-22, 35. 5 figs., lit.3

The author acquaints the reader with a method of preserving birds for school collections with the aid of Formax. This is a non-toxic, simple method which is suitable for use in schools. Formax is the author's designation of a mixture of a formaline solution and borax. The necessary laboratory apparatus is described - and a detailed instructions on how to proceed. The bird should be placed on its back. Individual sections are preserved by injections of Formax, especially the great flying muscles (pectorals) and the body cavity. Three basic rules are cited: work should be done in a well ventilated room, protective eyeglasses should be used and the teacher should continually supervise the work of his students. The mounting of the preserved bird is described. The author also mentions problems concerning protected species of birds. The article includes photographs showing the work.

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THE DIDACTICS OF BIOLOGY

A Selected Bibliography for 1979

PART II.

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10.4.6 Osteological specimens, specimens of skin derivatives

HOPPE, D.M.
Contemporary Skull Cleaning
The American Biology Teacher, 40, 1978, No.8, p.502.

The skulls of mammals are usually cleaned in two ways: by boiling or with the aid of some specie of insects. Both methods have their drawbacks. Boiling often damages seams and causes teeth to fall out. Cleaning with the aid of insects (for instance with Dermestes lardarius) is slow, but very inexpensive. But it is necessary to carefully chose the site of cleaning, because the insects can be dangerous for other specimens and stuffed animals. The author cites a third method which uses boiling, but will not damage dentions, and which is especially suitable for inexperienced students. The skulls are slowly boiled for a period of six to twelve hours in distilled water. The muscles in the head are then mechanically removed and the brain tissue flushed out with a stream of water. Bleaching is carried out with a 3 % solution of hydrogen peroxide for 2 to 8 hours. This method was tested on a large number of skulls, ranging in size from a gopher to a coyote. When teeth sometimes do fall out, it is not difficult to glue them back into their original place. This method is especially suitable for very fresh skulls or those which have been frozen, but is not suitable for material which has been preserved with formaline.

RA

10.4.9 Animal specimens in fluids

ZIMOROY, I.Y.

Isgotovleniye fiksirovannikh zoologicheskikh preparatov
(The preparation of fixed zoological specimens)
Biologiya v shkole, 53, 1979, No.2, p.71.

The most valuable ostensive teaching aids include living and fixed specimens, for instance insects in test tubes. For this the following are needed: test tubes, narrow glass slides (which can be cut from window glass), which are a little narrower then the test tubes used and are 1 - 1.5 cm long, gelatin , a 40 % solution of formaline, paper for lables and black drawing ink, sealing wax, two vessels, an electric boiler, a pair of pincers, scissors, a ruler, a mounting needle and cotton-wool. The insect should first be placed in a 6 - 8 % solution of formaline and gelatin and together with a label glued to the glass slide and placed in a test tube together with a 8 % solution of formaline. Each test tube is then sealed.

PH

10.5.1 Microscopical mounted specimens of plants

JURČÁK, J.

Náměty k mikroskopickému pozorování svazků cévních - I.
(Topics for microscopical observations of vein bundles - I.)
Přírodní vědy ve škole, 30, 1978/79, No.5, pp.165-167.
2 figs.

The article describes some simple methods of preparing microscopical mounted specimens of vein bundles and their observation, with stress on clarity, simpleness and the availability of plant material. They are intended for school botany excercises in general education secondary schools or for the activities of hobby clubs.

VČ

JURÁČEK, J.
Náměty k mikroskopickému pozorování svazků cév - II.
(Topics for microscopical observation of vein bundles - II.)
Přírodní vědy ve škole, 30, 1978/79, No.6, pp.205-209, 13 photos.

The author continues in the article published in issue No. 5 of the journal. He describes in detail the best material for making microscopy specimens of vein bundles in plants, with detailed instructions on how to proceed. The specimens are described in detail and they are accompanied by micro-photographs.

VČ

10.5.2 Microscopical mounted specimens of animals and those pertaining to human biology

PUGAL, N.A.
Noviy nabor mikropreparatov po zoologii (New sets of zoological micro-specimens)
Biologiya v shkole, 53, 1979, No.5, pp.44-45.

In 1979 general education school received newly produced sets of zoological microspecimens, which can be used in teaching on protozoa, coelenterata, plathe-minthes, roundworms, annelida, anthropoda and chordata. The specimens include those which can be used for demonstrations or for individual assignments by pupils. They can be observed normally, with a magnifying glass or with a microscope. The total of 18 specimens is described in detail.

FH

10.6.1 Models

BÖHLMANN, D.
Medien zur molekularen Zellbiologie I. Ein DNS- Modell konzipiert für die Hand des Schülers (Media for molecular cell biology - I. A DNA model designed for use by pupils)
Naturwissenschaften im Unterricht. Zeitschrift für die Unterrichtspraxis der Secundarstufe 1 - Biologie, 27, 1979, No.1, pp.26-30. 6 figs.

Pupils in the upper grades of secondary school often have difficulties in learning molecular biology and therefore this topic should receive greater attention. The author describes the use of a suitable DNA model made of colour modular elements. The model is made in a simple manner, so that all pupils are able to take it apart and put it together again. It makes it possible to understand this rather abstract topic and to demonstrate the helix shape it has, its de-spiralisation, replication and the reading of genetic information in the DNA code in the chromosomes.

AA

BÖHLMANN, D.
Medien zur molekularen Zellbiologie - II (Media for teaching molecular cell biology - II)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.5, pp.150-155., 6 figs.

The teaching of molecular cellular biology requires the use of ostensive teaching media. The author provides information on the use of models for understanding the basic phenomena of cells. With a model made of coloured building blocks the pupils can follow individual stages of the synthesis of proteins. This includes the transcription of DNA information to messenger RNA and its translation through messenger and transfere RNA into a specific sequence of amino-acids determined by triplets. The model is described from the point of view of how it is made and how it can be used in class. It can be supplemented with microscopic specimens. In conclusion, the author explains some basic terms of molecular biology as a help for teachers.

AA

DANNEEL, I.

Ein einfaches Muschelmodell - hilfreich, billig und leicht herzustellen (A simple model of a shellfish - helpful, inexpensive and simple to make)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.5, pp.156-157. 1 fig.

Teaching about the shellfish Anodonta cygnea can be supplemented with the making of a simple model out from paper. Needed are 5 cardboard folders in four different colours for making the conch, mantle, both gills (the external and internal) and the foot. Individual parts are cut out, sewen together by thread or with staples along the back (which represents the spinal cord); the position of the sphincters on the inner side of the conch can be drawn.

AA

DEAVER, J.R.

Modeling Limits to Cell Size
The American Biology Teacher, 40, 1978, No.8, pp.502-504, 1 fig., 2 tabs.

The article acquaints the reader with excercises in which students imitate changes which take place in the relation between the surface and the volume of a growing cell. They are thus better able to understand the fact that a cell after reaching a certain size must divide, instead of continuing to grow. Four of the model cells are cubical, made of cardboard; the smallest cell has an edge 1 unit long (a max. of 1.3 mm), while the largest, 4 units long. Each cell is filled with fine sand. The author describes various assignments which the students can carry out with the cells. They calculate the area of one square, as well as the total area of the surface of a cube shaped cell, its volume and the distance from the center of the cell to the nearest wall, its weight and the ratio between surface and volume. Then they are asked to answer a number of questions where the answers will lead them to correct considerations on the disadvantages of unlimited growth.

HA

HEBAUER, F.

Der Neurosimulator - ein Funktonsmodell zur Neurophysiologie in der Sekundarstufe II (A neurostimulator - a functional model for teaching nerve physiology in upper classes)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.3, pp.70-78. 8 figs.

The syllabus for biology teaching in Bavarian general education secondary schools includes extensive material on the physiology of the sensory organs. The author deals in detail with biochemical processes which occur in nerve cells during the processing and conduction of stimulation and processes which take place in the synapses. Audio-visual media cannot replace experiments; therefore the author suggests the use of functional models. He recommends the use of a electronic simulator for demonstrating basic processes on an oscilloscope. He cites the requirements which a simulator should fulfil and describes the construction of a functional model (including blueprints). The main parts of the functional model include a neurosimulator (NS 05), an oscilloscope and a stroboscope flashlight. During demonstrations it is possible to show the coding of stimulation, time refraction and the law of "all or nothing", as well as the time summation of pre-synaptical action potentials, the slowing down between presynaptical and postsynaptical membrane potentials and the special effect of photo-sensitive cells.

AA

HÜTTMANN, H.J.

Die Systole als Arbeitsphase der Herzmusculatur

(The systole as the working stage of the heart muscle)

Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.10, pp.305-307. 1 fig.

The human heart is a highly effective organ. During each systole every heart ventricle in a healthy adult pumps simultaneously approximately 70 ml of blood; the right ventricle pumps into the pulmonary artery and the left ventricle into the aorta. At 70 beats per minute, the minute volume of blood is equal to 5 litres. The daily volume (with a body weight of 70 kg) is 7 000 litres (i.e. a cube with sides of 1.9 m). The work done by the heart during one heartbeat is equal to 2 joules, per day this is equal to 200 kJ. The author describes an experimental apparatus which can demonstrate the activity of the heart, including isometric contraction, isotonic contraction, the diastole and pulse. Work with the appratus requires the use of interdisciplinary relations.

AA

KOZŁOWSKA, E.
Geografia komórki (The geography of the cell)
Biologia w szkole, 32, 1979, No.5, p.225, 2 figs.

The author describes a model of a cell. This is a hypothetical model which has the properties of both plant and animal cells. The model includes the nucleus with the nuclear membrane, chromosomes in the nucleus, nucleolus, protrusions which enlarge the surface of the cell, microfilaments, lysosomes, flagella, pinocytotic sacs, ribosomes, the endoplasmatic reticulum, chloroplasts, cell membranes and cell walls in plants. The model was made according to the National Geographic Magazine (1976, No.3).

AA

MADER, S.S.
Manual Manipulation to Teach Plant Tissues
The American Biology Teacher, 40, 1978, No.1, pp.39-41
2 figs., 3 tabs., lit. 6.

The author acquaints the reader with an assembly model which demonstrates the structure of a leaf, a root and of a xylem and non-xylem stem. The model can easily be made by students. The main aid in teaching is a static three-dimensional model and microphotographs. The assembly model contains three elements: external tissue, internal tissue and the vascular tissue of various organs; the latter two are interchangeable and the student can manipulate them. The effectiveness of the model has been tested. Both an experimental and control group of students had the same level of knowledge before the experiment. The experimental group demonstrated markedly better knowledge than the controls after use of the model.

PISCHER, W.
Ein neues Modell zur Verdeutlichung der Biosynthese von Eiweissen (A new model for showing the synthesis of proteins)
Naturwissenschaften im Unterricht. Zeitschrift für die Unterrichtspraxis der Secundarstufe I - Biologie, 27, 1979, No.1, p.30.

The new syllabus for biology teaching includes the topic of heredity at the molecular level and acquainting pupils with the laws of heredity. The author describes a suitable model made by the firm MBM Lehrmittel Verlag, GmbH in Hofheim am Taunus. The model is made of simple segments from which a DNA molecule model can be made, as well as sequences of other amino-acids, etc.

AA

POENICKE, H.W.
Ein Modell der Zwerchfellatmung, das rasch und preiswert durch Schüller herzustellen ist (A model of diaphragmal breathing easily made by pupils and free of charge)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.5, pp.132-134. 1 fig.

The author first describes other models of diaphragmal breathing - such as the glass model by Donders and the improved model by Bonatz. He then suggests making a much cheaper and simpler model by using a bottle made of plastic (for instance in which vingar is sold), whose bottom is cut out and replaced by a rubber sheet. Otherwise the model is similar to the above mentioned ones, but demonstrates the activity of only a single baloon - one lung - because of the small volume of the bottle. But the model can cheaply and quickly be made by every pupil on the basis of a teacher's instructions, either in school, or at home as homework.

AA

SCHWARTZENBACH, A.

Ein Mini-Planetarium für den Unterricht (A mini-planetarium for teaching)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.6, pp.154-160, 13 figs.

A planetarium serves to demonstrate the path of the Sun, stars and constellations. It makes it possible to accelerate the movement of celestial bodies and to indicate the path and position of the Sun over any point on Earth at any time of the year. It can be used in teaching geography, physics, but also biology - for instance for demonstrating the seasonal movement of birds. The article contains instructions for building a mini-planetarium in a classroom, and how it should be used for teaching various topics.

AA

TVOROGOVA,A.S.

Izgotovleniye modeli ustitsa (Making a model of plant ducts)

Biologiya v shkole, 53, 1979, No.6, p.45, 1 fig.

The author describes making a model of a duct for use in botany teaching in the 5th class. The model makes is easier to understand the principle of functioning of plant ducts. The material used for making the model is polyethylene or rubber.

FH

10.7.1 Films (school, scientific and popular, cassettes)

CARTER, J.L. - CADEN, R.L. - HEIM, W.G.
Human Genetics, Birth Defects and Values: A Review of Audiovisuals
The American Biology Teacher, 40, 1978, No.5, pp.304-308, 1 appendix.

Within the framework of a project to assess biology syllabi on the subject of human genetics, various audiovisual aids have also been assessed. These include films, slides, and phonograph records or tape recordings. The authors especially discuss those programs which are of excellent or of doubtful quality. These include three sound films, several series of slides and combined programs. The name, producer, description and assessment of each are cited and the type of school it is best suited for. In conclusion, the authors address some comments on the programs to their makers and also to teachers who will use them in school. The appendix contains a list of programs which are commercially available and have been assessed in the article.

RA

DYLLA, K.
Eine Arbeitsfilmserie zur ökologischen Ethologie :Blattschneiderameisen (From a series of films on ecological ethology: The Sewing ant)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.12, pp.328-332, 2 tabs.

The film producers Windrose, Hamburg have made a new series of films for the lower grades of secondary school which can, however, be used from the 7th class of basic school up to the upper classes of secondary school. The films were made by a team of cameramen from the firm BASF and were made in South America and also at the BASF research station in Limburg. The films deal with the ethology of the Sewing ant, the mating flight of the queen, the forming of a colony, the cutting and transportation of the leaves, the cultivation of fungi by the ants, the feeding and development of the ants and the equilibrium which exists between the ants and the fungi.

AA

PRONĚK, J.

Přírodovědné filmy na přehlídce Schola film 78 (Nature films at the Schola Film Festival 1978)

Přírodní vědy ve škole, 30, 1978/79, No.7, p.250.

The Schola Film Festival took place on October 10th to November 5th, 1978 in Brno. Among the nature films intended for the teaching of the natural sciences and biology, a total of thirteen films from 8 countries were shown. Among the foreign films, greatest attention was focused on the Polish films "The Work Done by the Oral Cavity and Stomach" and "The Work Done by the Cardiac Valves."

VŎ

GRONBACH, H.

Der besondere Film (A special film)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.11, pp.304-305.

Information on two excellent nature films made by IWF, Göttigen. One deals with the marine order Acetabularia (Dasycladales), the specie Acetabularia mediterranea, which lives in the shallow coastal waters of tropical and subtropical areas. Its "cup" is approximately 1 cm in diameter, on a stem approximately 6 cm long. The film shows its reproduction, copulation, its zygote and the alternation of generations with sexual and asexual reproduction. The second film deals with the Brasilian frog Pipa Carvalhoi, its interesting reproduction, optical and acustic mating call, copulation, laying of fertilised eggs on the back of the female and the development of the eggs.

AA

LEICHT, W.H. - HOCHMUTH, K.
Eine empirische Untersuchung über die Effektivität von Tonfilm und Lichtbild im Biologieunterricht
(An empirical research project on the effectiveness of sound films and slide series in biology teaching)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.3, pp.65-69.

The importance of teaching media is generally accepted. Nevertheless, there are very few empirial studies on the effectiveness of various types of these media in biology teaching. Generally speaking, films are the most effective form; they are more effective than slide series, as is documented in the cited study.

AA

RUMIAN, P.
Strukturní prvky výukového biologického filmu
(Structural elements of biology teaching films)
Přírodní vědy ve škole, 30, 1978/79, No.1, pp.7-9.

The author acquaints the reader with the structure and individual elements of biology teaching films. The basic element of a film is a shot which isolates a segment of film reality. The order and sequence of these shots determines the degree of understanding and logic which the film conveys. Shots can be divided into details (which are often used in biology), and general shots, with which the film begins and ends.

Individual shots, sequences, and sections form the composition of the whole, which should be in harmony with the didactical aims of the film. Films make it possible to integrate elements of sensory ostensiveness and verbal notions, with the aid of sub-titles (silent and sound films), symbols and film tricks. Including a film on biology into teaching makes an important educational and teaching contribution. Nevertheless, films are insufficiently used in teaching. This is caused on the one hand by a lack of good quality films and on the other by the insufficient knowledge on the part of teachers on the use of this important teaching medium.

vð

SCHMIDT, H.
Neues aus dem FWU: Materialen für Evolution II.
(New items from FWU: Material on evolution II.)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.12, pp.332-335, 5 figs.

The Institute for Films and Pictures, in cooperation with the V-Dia Publishers have produced a new series of slides concerning the evolution of man and two further series on the races of man. The series on the evolution of man deals with the following problems: methods for dating findings, the C_{14} and K/Ar methods, the methods of accompanying fossils and rock layers, reconstructions; comparisons between contemporary man and primates (the period of the last 15 to 20 million years); fossils from Africa (Olduvai, Taung, Swartkrans). The series of slides on human races in two parts deals with the variability of man, Negroid and Europoid populations, the division of human races on the Earth, the incidence of sickle-cell anemia in relation to malaria and the distribution of the 0 blood group in comparison to the distribution of sickle-cell anemia and the crossbreeding of races.

AA

SCHMIDT, H.
Neues aus dem FWU: Materialen zur Evolution I.
(New items from FWU: Material on Evolution I.)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.11, pp.299-304, 4 figs.

The firm FWU has developed a number of aids (films and slides) concerning the topic The Evolution of Organisms. These include the films "Fossiles" (8 mm), "From Fossils to Reconstructions" (9 slides), which concern Lepidodendrons and their below and above ground parts; "The Development of the Phylum Birds" (11 slides), "Living Fossils" (19 slides), "Homology and Involution of Organs" (16 slides), "The Convergence of Succulent Plants" (10 slides), "The Adaptive Branching of Australian Marsupialia" (16 mm film), "Reptiles" (16 mm film), "The Development of Cultivated Plants - Maize and Lupine" (11 slides), "From Wild to Cultivated Forms of Wheat" (13 slides), "How New Varieties of Potatoes are Developed" (23 slides), "Protective and Warning Coloration in the Animal Kingdom" (24 slides).

AA

SCHMIDT, H.

Neues aus dem Institut für Film und Bild (FWU). Zwei neue Monographien: "Der Flusskrebs" und "Die Wildkatze" (New items from the Institute for Films and Pictures (FWU). Two new monographs: "The Crayfish" and "The Wildcat")
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.4, pp.107-111, 4 figs.

The FWU Institute has produced two new films cited in the title, which are of exceptional quality. The film on the crayfish shows its ecdysis, copulation, the female with eggs, feeding, the structure of its body and movement. The wildcat is shown in copulation, its behaviour, feeding habits, giving birth, the development of the cubs, their weaning and the aggressive behaviour of the wildcat.

AA

10.7.2 Television, radio

HARTMANN, U.

Schulfunk zur Tierzüchtung (School radio programs on animal breeding)
Biologie in der Schule, 28, 1979, No.4, pp.156-158. 1 fig.

The author first cites the name of the program, its connection with biology teaching and the date of the broadcast. She then analyses the content of the program, which essentially deals with two excursions: to a farm and to a research station. A picture provides an outline of the cross-breeding of pigs.

FH

HARTMANN, U.

Schulfunksendung "ZumNutzen des Menschen - Wege zur Erforschung der Sexualhormone" (School radio broadcasts: "On behalf of mankind: methods of studying sex hormones")

Biologie in der Schule, 28, 1979, No.2-3, pp.122-123.

This topic is suitable for biology teaching in the 8th class. Besides citing the date of the broadcast and the radio station, the author also discusses the content of the program. It deals first with the history of the problem (proof of sperms in 1677), the study of estrogens (1905-1935), up to birth control pills (1965). The broadcast contains explanations, commentaries and sound recordings (for instance of birds).

FH

HARTMANN, U. - DINTER, H. - WEBER, B.

Schulfernsehen zur Abstammung des Menschen - Unterrichtsendereihe Klasse 10. Sendung 7 (School television on the evolution of man - broadcasts for the 10th class - 7 programs)

Biologie in der Schule, 28, 1979, No.2-3, pp.124-125.

Besides technical data, the authors also discuss the function and aim of the broadcast. The programs deal especially with developments in the Tertiary era. The article discusses the content of the programs in detail, especially the following predecesors of man: Propliopithecus, Ramapithecus, Homo habilis, Homo erectus, Homo neanderthalensis, Homo sapiens presapiens. In conclusion several methodological comments are made.

FH

KRIPPA, V.Y.
Televizyonniye uchebniye peredachi po obshchey biologii
(Television broadcasts for schools concerning the general biology syllabus)
Biologiya v shkole, 53, 1979, No.4, pp.44-45.

Television broadcasts have already for ten years been part of school teaching. These programs have unlimited possibilities: the demonstration of facts, events, excursions. The programs concerning general biology were broadcast already in the school year 1966/67, when schools adopted the new biology syllabus. In the school year 1979/80, a total of 18 programs on general biology are prepared for the 9th and 10th classes. The author cites their dates, topics and methodological comments on them.

FH

Schulfernsehen und Schulfunk im Schuljahr 1979/80
(School television and radio programs in the school year 1979/80)
Biologie in der Schule, 28, 1979, No.7/8, pp.345-349.

The article cites the dates, time, content and relation to syllabus, as well as the didactical function of television programs for the 9th and 10th classes. Radio programs are more of a supplementary nature; in them, biology is a part of programs on mathematics and the natural sciences.

FH

10.7.3.3 Foliograms and transparencies

HÜNGSBERG-SENZ, U.
Zellen vermehren sich durch Teilung - eine Unterrichtsstunde für das 8. Schuljahr (Cells multiply by division - a teaching lesson for the 8th class)
Naturwissenschaften im Unterricht. Zeitschrift für die Unterrichtspraxis der Sekundarstufe I - Biologie, 27, 1979, No.1, pp.16-23, design for 2 foliograms, 1 worksheet, 2 tabs.

The division of cells is one of the basic chapters of biology teaching, without which a number of other topics are not comprehensible. For this reason teaching this topic requires a high degree of ostensiveness, since the subject matter is of an abstract nature for pupils. The article describes various didactical possibilities in teaching this topic and especially the use of self-made foliograms used with an overhead projector. The transparencies concern cell division and its various stages: interphase, prophase, metaphase, anaphase and telophase. On the basis of a structural analysis the required terms are learned. In conclusion, the author stresses that all organisms grow and their cells multiply and this is done on the basis of cell division.

AA

TERSTEGGE, G.
Fotografische Herstellung von Overhead-Folien
(Making photographic foliograms for overhead projection)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.1, p.24.

Black and white foliograms for an overhead projector on the basis of the teacher's own material can be made on documentary film (Agfa Ortho 25). With a reflex camera a negative of the drawing is made, which is then enlarged. A suitable size for this is DIN A4. The best exposition for the magnification is 1 - 2 sec, the best developer is Eukobrom 1:6. Both a fixativing bath and fixation with superfix are necessary. When the exposed foliograms dry, they can be labelled with special colour pencils.

AA

WOLSCH, J.
Einsatz von Arbeitstransparenten im Unterricht (Sekundarstufe I), zum Thema "Hutpilze" (The use of transparencies in teaching in the lower grades of secondary school - the topic agaricaceae fungi)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.7, pp.193-209, 11 figs., 10 tabs.

The author discusses the best way to teach the topic cited in the title. He stresses the structure development, nutrition and metabolism of the fungi, the shape of the mycorrhiza or fungus root and the importance of fungi for the circulation of matter. Ostensive aids include a transparancy combined with a worksheet. Also original objects can be used if they are available, as well as slides and microscopy specimens. Experiments can serve to prove the respiration of the agaricus mushroom in a cylinder with a burning candle, by calcium water becoming turbid because of respiration of fungi and by demonstrating an increase in temperature in the course of respiration of fungi in a thermos bottle. Also specimens of the spores of fungi can be shown on transparancies.

AA

10.7.5 Slides and slide series

BINDER, H.

Tonbildschau: Rauchen und Gesundheit (Sound pictures: Smoking and health)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.5, p.139

A group of physicians in Mannheim concerned with the problem of smoking and health has prepared a series of sound slides concerning smoking and health, for use in lectures in the schools of Baden-Württemberg and Rheinland-Palatinate. The slide series and cassette tapes are given free of charge to those schools which promise to use them in all classes and to repeat this every two years. The program takes 45 minutes and includes 50 slides.

AA

SCHUBERT, F.

Eine neue Tonbildreihe: Menschenrassen und Rasismus

(A new slide series accompanied by tape cassette on human races and racism)

Biologie in der Schule, 28, 1979, No.6, pp.233-246.

Slide series accompanied by taped sound first appeared in schools at the end of 1978. The newest series is composed of two parts: one concerns the determination of races and the second concerns racism. The author provides a number of comments on the program and discusses opportunities for its use. In conclusion he comments on the experiences gained in class with the program.

FH

10.7.6 Sketches, floral diagrams and formulas

SCHIEFER, H.
Überlegungen zur Bewertung mikroskopischer Zeichnungen
(Considerations concerning the assessment of microscopy drawings)
Biologie in der Schule, 28, 1979, No.10, pp.433-434.

In biology teaching in general education secondary schools the syllabus includes the microscopy of permanently mounted natural specimens(as well as in elective subjects).This is usually connected with drawing what has been observed. However, the quality of the drawings tend to vary and therefore pupils would profit from knowing what assessment criteria are used. The author discusses this problem in detail, including the content of the drawing, its form, description, etc.

FH

10.7.9 Rubber stamps, impressions, photograms

FREJLAK, S.
Matryce kauczukowe jako pomocniczy środek dydaktyczny
(Rubber stamps as a didactical aid)
Biologia w szkole, 32, 1979, No.1, pp.33-34, 8 figs.

The author recommends the making and use of rubber stamps for making basic outlines, for use in class, such as for instance the visual field of a microscope, the outline of a man, the outline of a plant cell and an animal cell, outlines of selected animals, of the human brain, tables for writing hereditary signs according to Mendel's laws, outlines of maps, etc.

AA

KÖRNIG, G.

Bemerkungen zu den Stempelsätzen für die Klassen 7 bis 10.
(Comments on sets of rubber stamps for the 7th to 10th classes)
Biologie in der Schule, 28, 1979, No.4, pp.135-141.
4 figs.

Rubber stamps which are available for schools have been exhibited at the Interscola Exhibition in 1978. They include objects which have clear outlines. The author discusses the didactical use of these rubber stamps in teaching. They simplify the passing on of information, improve motivation, strengthen knowledge and skills, as well as the application of knowledge, etc. The author also provides a survey of the rubber stamps available and discusses method of their use.

FH

10.8.2 School bulletin boards, press clippings

ZUCCHI, J.

Collagen im Umweltunterricht - Ein Vorschlag zur Behandlung des Themas "Ausrottung - Artenschutz"
(Collages in teaching on the environment - a design for the topic "Extinction of Species - Conservation")
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.6, pp.162-166. 1 fig.

The topic "Extinction - Conservation of the Species" has not been dealt with in specialized didactical literature. The author makes various suggestions in this context, which he himself verified in his work in a Hesse nature conservation organization. Besides various didactical aspects, the author also recommends making collages on this topic which can be exhibitied.

The illustrations show such collages, made by 8 to 12 year-old pupils with the use of press clippings.

AA

10.8.3 Textbooks, methodological handbooks and manuals

A kisérleti tankönyvek kipróbálásárol (The testing of experimental textbooks)
A biológia tanítás, 17, 1978, No.1, pp.1-10.

Since 1978 new experimental textbooks have been in use, for the purpose of their verification. The assessment of the textbooks thus gained are now being studied. Some of the findings gained from the verification project are very important.

LAPPINTS, Á
Az A variánsú szakközépiskolák I. osztályos biológia-könyvérol (Biology textbooks for the 1st class of vocational secondary schools, type A)
A biologia tanítás, 17, 1978, No.3, pp.76-79.

The author describes the specific aspects of new textbooks from the point of view of their form and how they adjust to new conditions.

SCHULZE, G.

Zu einigen Fragen der naturwissenschaftlichen Schulbücher nach dem VIII. Pädagogischen Kongress (On some problems of natural science textbooks after the 8th Pedagogical Congress)

Biologie in der Schule, 28, 1979, No.10, pp.427-430.

The specific orientation of the 8th Pedagogical Congress in the area of natural science education has been the point of departure for the preparation of new textbooks. The stability of teaching material is an important prerequisite for implementing the syllabus. In the writing of these textbooks, all opportunities should be used to motivate pupils, including the emotional ties of pupils towards living organisms and stressing experimental procedures.

FH

WEINBERG, S.L.

Two Views on the Textbook Watchers

The American Biology Teacher, 40, 1978, No.9, pp.541-545, 560.

In this article the author compares the work of D. Nelkon (1977) and J.C. Hefley (1976) who hold contradictory positions on the subject of textbook criticism. First those aspects of textbook criticism where both authors agree are described and then their differences. The author also deals in detail with Hefley's article on Norma Gabler from Texas, who has carried out revisions of various textbooks and her method of work. Methods of textbook revisions used by partisans of creationism, who try to exclude all mentions of evolution, materialism, atheism and sexual education from textbooks are described. The author comments on the motives and activities of such textbook criticism and how it is carried out.

RA

10.8.4 Syllabi

BAUDÉ, J.
Présendation des micro-ordinateurs LX 500 et X 1 implantés dans les lycées (A presentation of instruments for program teaching LX 500 and X 1, used in lyceums)
Biologie, Géologie, 66, 1979, No.4, pp.651-656. 3 figs.

The Council of Ministers of the French Republic has decided that in the course of five years all secondary schools should be equipped with a total of 10 000 instruments for program teaching. The author describes the system, opportunities for and methods of using the instruments in teaching various disciplines. The price of such an instrument is approximately 20 000 francs.

LR

BUTZEL, H.M. - BOYER, J.P.
Teaching the Relationship of Mutations and Protein Structure: A Computer Demonstration
The American Biology Teacher, 40, 1978, No.8, pp.499-501, 2 tabs.

The fundamental biological discovery of the last half century is the finding that the linear ordering of four DNA and RNA bases grouped in triplets specify the sequence of aminoacids in proteins. Changes in this sequence (mutations), cause genetic changes which are, from the point of view of evolution, either favourable or unfavourable, as well as changes in the specificity and activity of proteins. If high school and college students are to better understand these facts new teaching methods should be used; the authors have drawn up a computer program which simulates various types of independent mutations and tabulates findings. The program begins with the linear sequences of the letters A, G, C, U, which designate RNA chains. These sequences are then modified. The article describes in detail the procedures which take place when individual bases change and thus structure changes in mutuations. In conclusion technical data are provided on the use of the program and its adaptation to three various levels of teaching (genetics and evolution, biochemical and molecular genetics and human genetics).

RA

COOMBS, R.E.
Individualization and Student Freedom to Choose
The American Biology Teacher, 40, 1978, No.6, pp.365-368, 2 tabs.

The article acquaints the reader with a project to test the effectiveness of freedom of choice in study programs in the course of an audiovisual botany course. First a bibliography on the problem is provided. Then the author describes the botany course and the research methodology it uses. A pre-test and post-test method was used and compared to a control group. The findings of the project are summed up in tables which are accompanied by detailed descriptions. It was found that when students have the opportunity to chose their own study program, this leads to a substantial strengthening of the effective learning process: also when a free selection of mini-courses is possible, this clearly leads to an extention of the period of recall of learned facts.

RA

GRIMM, F.M. III.

Computer Simulations as a Teaching Tool in Community Colleges

The American Biology Teacher, 40, 1978, pp.362-354, 380, 2 tabs.

The author deals with an approach to new teaching methods in connection with new discoveries in biology. Computer methods are especially useful for this. The introduction sums up the advantages, as well as some of the drawbacks, which sometime appear in the students´ ways of thinking. The author deals in detail with computer simulation in a biology course, on the basis of experience from Hartford College. The biology disciplines which were chosen for this activity included environment theory, genetics, population theory, sociobiology. A summary table cites the names of eight various programs, their subject matter and the institution which drew up the program. Also the type of computer needed is described and the preliminary knowledge which the students should have. Special attention is paid to the problem of the individualization of the program.

RA

JEROME, P.

L´informatique, support logique de la démarche experimentale en sciences naturelles. (Information theory as a logical basis for experimental activities in the natural sciences)

Biologie, Géologie, 66, 1979, No.4, pp.663-781. 56 figs.

An extensive article concerning the practical use of facilities for program teaching. Examples are taken from 8 practical experiments, all in the natural sciences. They are supplemented by various diagrams and provide answers to numerous questions. In view of the fact that these facilities are being introduced to French schools on a mass scale, the article brings numerous helpful suggestions, comments and recommendations for teachers.

LR

KAHLE, J.B.

A-T Instruction: A Perspective and a Prediction

The American Biology Teacher, 40, 1978, No.1, pp.17-20, 42, lit. 21.

The author discusses audio-tutorial (A-T) methods of teaching. This method is well known, but is not often used. First the original intentions of the author of the A-T program are described, as well as contemporary opinions concerning this method. The author of the article also aquaints the reader with a selected experimental model of A-T teaching with its four basic components. The application and adaptation of the model was also studied. Before the project proper it was necessary to first fulfil three stages of preliminary study, which are briefly characterized. The article deals in detail with a model of A-T instruction as a research method.

RA

10.8.5 Worksheets, workbooks, didactic tests, questionnaire, didactical games

CONNALLY, J.

Web Roles: A Simulation of Biotic Adaptations and Relationships

(The American Biology Teacher, 40, 1978, No.2, pp.82-84. 4 figs.

The author acquaints the reader with methods of teaching some aspects of biology. On the basis of his own recollections of childhood, which were of course supplemented by subsequent study, the author has formed a program called Web Roles. The aim of the game is to help students understand problems of living organisms in relation to the environment. The conditions needed for the game are described, as well as other prerequisites. The students form groups of four. Each receives a card with the role he is to play on it, for instance a lion, a roebuck, a man. A sample of such a card is attached. Students answer questions given on another card, whereby they chose the characteristics of their roles. The necessary preliminary work is described - which includes becoming acquainted with the vicinity of the school, making the cards, designation of individual roles, etc. After the completion of the game the students answer control questions and explain what they have learnt. Finally, the game is assessed.

RA

FRĄTCZAK, J.
Testy w kontroli i ocenie wiadomości i umiejętności
(Tests in the determination and assessment of knowledge and skills)
Biologia w szkole, 32, 1979, No.3, pp.122-127.
1 tab., 6 figs.

The author provides information on various types of tests for determining and assessing the knowledge and skills of various organisational forms of biology teaching. He discusses tasks which are formulated in an open manner (the answer is in the form of a discussion, a brief answer or in the form of "yes" or "no") or in a closed manner (with multiple choice answers, alternative answers, multi-step answers).

The test itself can include verbal questions, graphical tasks and a combination of both and can be in writing or oral. The author stresses the variety of tasks and assignments given in tests and the significance of various types of assignments. He provides practical examples.

AA

HOMOLA, J.
Pracovní listy laboratorních prací z biologie
(Worksheets for laboratory work in biology)
Přírodní vědy ve škole, 30, 1978/79, No.10, pp.362-363, 1 tab.

The article contains two samples of worksheets in biology for the 4th class of general education secondary schools. In the first, the subject - matter of the relation between the function of the skeleton and muscles in the human body is taught. The second deals with how to determine the vital capacity of the lungs with the aid of a spirometer. The worksheets contain a precise description of the aim of the work, a description of the material, needed aids and procedures recommended, and also methodological instructions for the teacher.

VČ

HORVÁTH, E.
Új biológiai munkafüzetek a szakközépiskolákban
(New worksheets and workbooks for biology teaching in secondary vocational schools)
A biológia tanítása, 17, 1978, No.3, pp.79-83

An analysis of a new teaching aid, which is classified into categories A, B, C and D and the differences existing between them are explained.

HORVÁTHNÉ, K.A.
"Biológiai Munkanapló" az óvónöi szakközépiskolában
(A workbook for use in a secondary school educating kindergarten teachers)
A biológia tanítása, 17, 1978, No.1, pp.11-15.

This teaching aid is divided into six parts, on the basis of the biology syllabus. It fulfils all requirements for a modern teaching aid.

HÜBNER, R.
Spiele zum Umweltschutz - eine kritische Bestandaufnahme
(Games on the environment - a critical inventory)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.2, pp.57-60

The author provides a survey of contemporary didactical games concerning the conservation of the environment, available in the Federal Republic, which can also be used in biology teaching. He descripes individual games, their name, publisher and opportunities for use in individual types of schools.

AA

PŁYTYCZ, B.
Proste testy z wiadomości elementarnych (Simple tests on basic knowledge)
Biologie w szkole, 32, 1979, No.5, pp.217-220.
4 tests.

In biology, the pupils must learn a number of terms, which together form the special language of the discipline. The author acquaints the reader with her own work in the forming of basic biological terms in teaching zoology in the 2nd class of general education secondary schools. She asks her pupils to keep notes concerning all basic terms, which are then made more precise and are connected together into a system of basic terms. With the help of very simple tests she always verifies the pupils' knowledge of these terms at the beginning of each teaching lesson. Each test has three versions, to prevent the pupils' copying from each other. But all versions are equally difficult. The tests serve the strengthening and learning of elementary knowledge, not for gaining marks for the pupils. The tests include the names of biological phenomena and processes and their components (parts of the brain, heart, the compostion of the stomach of cattle, the names of geological eras - from the oldest to the most recent, the division of higher systematic units into lower ones), the definition of terms, an enumeration of the characteristics of a given systematic unit, etc. During the course of the term the pupils take a total of 12 tests, which are assessed on a scale of 1-7. The points recieved for the tests are then added. The author provides examples of such tests.

AA

RUDZKI, B.
Przyklady testów egzaminacyjnych na wyższe uczelnie
(Examples of examination tests for acceptance to a higher level school)
Biologia w szkole, 32, 1979, No.5, pp.220-223.

The author describes tests for the 8th class where pupils are preparing to take entrance examinations for acceptance to a higher level school. The tests concern problems of the nervous system, microscopy techniques, the comparative anatomy of vertebrates, plant physiology, nature conservation, bio-catalysers, general genetics and the significance of genetics. The tests have multiple choice answers. For instance:

How can the magnification of a microcope be determined ?
A. It is determined by the magnification of the eyepiece.
B. It is determined by the magnification of the objective.
C. It is determined by the sum of the magnifications of the eyepiece and objective.
D. It is determined by the product of the magnifications of the eyepiece and objective.

AA

STEVENS, J.T. - ATWOOD, R.K.
Interest Scores as Predictors of Science Process Performance for Junior High Students
Science Education, 62, 1978, No.3, pp.303-308. 3 tabs.

The authors acquaint the reader with the findings of a research project which was carried out among younger pupils and which aimed at testing the relation between interests and the performance of pupils in the natural sciences. The dependent variable in the project was the science process. The experimental group was formed by students in three age groups, from six states and ten different school systems. A Test of Science Process by Tannenbaum was used. These processes include observations, comparisons, classifications, qualifications, measurements, experiments, the drawing of conclusions and making predictions. The interest of students was measured by a Science Interest Questionnaire. The article describes in detail the findings from both tests, their statistical processing and various recommendations made by the authors.

RA

SZYLARSKA, E.

Test z przyrody i higieny - klasa III. (A test in nature studies and hygiene - for the IIIrd class)

Biologia w szkole, 32, 1979, No.3, pp.115-117. 2 figs.

The author describes a test for the pupils of the 3rd class. The test has multiple choice answers. The correct answer is designated by a cross, or missing facts are filled in or are graphically represented. Some of the questions require a drawing as an answer.

AA

WITTE, J.

Ein Evolutionsspiel zur Veranschaulichung der Gendrift

(Games concerning evolution for demonstrating gene drift)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.5, pp.128-131.

In the final classes of general education secondary school, evolution theory and the evolution of the organism are taught. However, there are not enough ostensive teaching aids to help in activating pupils in class. The author therefore recommends the playing of a special game which demonstrates for pupils the transition of genes (so-called gene drift) in the population. It shows the fate of a single germinating cell in a population with a new mutation, which in connection with various evolutionary factors is either maintained in the population, disappears or reappears after several generations. In small populations such fluctuations of random processes in the gene pool are significant and can be designated as a gene drift or as the Sewall-Wright effect. The principle of the game described is a simulation of the gene drift of a diplont which reproduces sexually. This represents a highly simplified model situation.

AA

10.8.7 Basic scientific literature, literature dealing with the didactics of biology, bibliographies and card indexes and biological periodicals.

MAKSIMOV, B.V.
Pourochnaya kartoteka v kabinete biologii (A card index of lessons in the biology study room)
Biologiya v shkole, 53, 1979, No.3, pp.46-47.

In order to improve the didactical preparation of each lesson, a card index of individual lessons has been started. In the biology study room there are 455 envelopes which contain cards for all biology classes from the 4th to the 10th classes. The cards are made of stiff paper and their content is divided into 17 points. Besides the cards, the envelopes also contain transparencies, slides, photographs, drawings, diagrams, quotations from books, pictures, etc. The itself envelope carries data on the topic, number of the lesson, class and pictures pertaining to the topic to be taught. On the back of the envelope are notes on the aim of the lesson and the main procedures used during the lesson (usually in the form of symbols). The author describes various advantages of this system.

PH

PODSTOLSKA, M.
Czasopisma pedagogiczne w systemie oświaty i wychowania (Pedagogical journals in the system of education and adult education)
Biologia w szkole, 32, 1979, No.1, pp.44-45, 1 fig.

In November 1978 a seminar was held in Warsaw on the tasks of pedagogical journals in the development of the socialist system of education and adult education, which concentrated on the general reform of the educational system under preparation. In the papers presented to the seminar, the activities of pedagogical journals were discussed and how they contribute to the fulfillment of accepted resolutions. The Minister of Education, Dr. J. Kuberski, participated in the seminar, as well as representatives of the radio, TV and the editors-in-chief of individual pedagogical journals.

AA

STAWIŃSKI, W.

Z piśmiennictwa metodycznego w RFN (On the methodological literature published in the Federal Republic of Germany)

Biologia w szkole, 32, 1979, No.5, pp.206-212.

In the Federal Republic of Germany several journals specialising in the didactics of biology are published. These include Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, Der mathematische und naturwissenschaftliche Unterricht - MNU, Der Biologieunterricht, Naturwissenschaften im Unterricht - Biologie and Unterricht Biologie.

The author provides information on articles published in 1978 in the journal Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen. This monthly is published in three series (biology, chemistry and physics). Each issue has 28 pages, annually approximately 240 pages. Its content concentrates on biology teaching in the 8th to 10th classes, sometimes also the 5th to 7th classes. Each issue has three sections: 1. articles, 2. brief information on conferences, new didactical media, and current problems of the conservation of the environment and 3. bibliographical information.

10 non-numbered pages in each issue contain advertisements of various media for biology teaching and information on newly published books.

AA

WEINBERG, S.L.
Writing in the Life Sciences
The American Biology Teacher, 40, No.3, pp.156-159.

The article deals with writing in the life sciences. There is great interest in having articles published, as is evident from the data on the number of articles received by various journals. The author discusses the problems of beginner authors. The reasons why young people write are commented on. Problems of serious writing are discussed, as well as the decision concerning what to write, whether an article, a book or a textbook, how to sell a book, what a publishing contract should include and how to proceed in the writing of a successful book. In conclusion, the author claims that there is no difference between writing on the natural sciences and on other subjects. The same rules should be adhered to.

RA

10.8.8 Popular scientific literature

MARKS, G.H.
Teaching Biology With Science Fiction
The American Biology Teacher, 40, 1978, No.5, pp.275-279, 2 tabs., 1 appendix, lit. 6.

The author discusses science fiction as a teaching medium in biology. This type of literature was considered to be merely recreational and thus not considered worthy of a place in the curriculum. In the author's opinion this may be the literature of the future and a teacher should take it into account. It can be very successful as a motivating factor and arouse an interest in more detailed information on a subject. Besides purely biological problems, such as overpopulation and problems concerning ecology, it also deals with social problems, such as nuclear arms, conflicts between the individual and society, the utilization of biological factors by society and the influence of man on the environment. The author cites his own experiences with the use of science fiction in class. In a survey (in the form of a table) various subjects dealt with in science fiction are cited and the biological problems they pertain to. An appendix contains a number of titles which can be recommended to the teacher.

RA

10.9 Tools and instruments for biology teaching

QUASIGROCH, G.
Sinnvoller Einsatz technischer Hilfsmittel - Ein Erfahrungsbericht über den Umgang mit Medien im Biologieunterricht (The considered use of technical media - a report on experiences with teaching media in biology)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.8, pp.250-253.

Today nature science teachers are no longer able to teach with only chalk and a sponge.They have a number of technical media available. However, the technical media used should be critically assessed, verified and tested to see whether the result they produce in the teaching process justify the financial resources which they represent. The author provides information on his own experiences, especially as far as various projection instruments are concerned, as well as microscopes for use in class. His article should serve as an impulse to discussions among other teachers. Among the technical media most often used in schools the author includes the following: an overhead projector, a film projector, an epidiascope and slide projector, a tape recorder, a projector for microscopy specimens, a microscope, a magnifying glass and a stereoscope. He asseses these various technical media from the point of view of their importance for teaching.

AA

RÖPKE, R.

Phonocard ^{R} - ein neues Experimentengerät für den Biologieunterricht der Secundarstufe I. (The Phonocard ^{R} - a new experimental inctrument for biology teaching in secondary schools)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.1, pp.21-24, 3 figs.

A new instrument for a demonstration of the auscultation of the activity of the heart, lungs and blood circulation is called a phonocard. The author describes the instrument, how it should be assembled and used in class for listening to and recording heart activity. It can be used not only for the auscultation of the above named organs, but also in work or sports physiology, for an analysis of the relation between heartbeat and pulse, pulse and respiration and for demonstrating the phenomenon of stress and also for bioacoustics (among insects, vertebrates, etc.).

AA

10.9.2 Tools and aids for experimenting with natural specimens and for collecting natural specimens

BINDER, H.

Plastik-Petrischalen und einfache Methode zu ihrer Sterilisierung (Petri dishes made of plastic and a simple method of their sterilization)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.2, pp.50-51.

In biology teaching, sterilized Petri dishes made of plastic are often used. In comparison to glass dishes they are lighter, they are easier to store, are unbreakable, cheaper, are more easy to cover tightly and can be glued together with chloroform or tetrachlore. However, they also have some disadvantages, because they can easily be disfigured when exposed to heat or a flame and they do not last as long as glass dishes. They can be re-used after sterilization, but this sterilisation cannot be done by heat. The dishes should be washed and dried and then placed in a sterilization tank with a tight cover. On the bottom of the tank a piece of cotton-wool which is moist with water is placed and on it a Becher flask with two to three pastilles of formaline (for 5 litres volume). The sterilization tank is then tightly closed and placed for 16 to 24 hours in a temperature controlled oven at temperatures of 40 °C.

AA

GORDINSKIY, A.S.

Portativniy bioinstrumentariy (A portable mounting kit)

Biologiya v shkole, 53, 1979, No.4, pp.68-69, 1 fig.

Preparations for carrying out laboratory excercises can be simplified if all the necessary tools are in one place. In the school where the author is a teacher, a portable kit in a small suitcase has been assembled where all the tools most often necessary in laboratory work are gathered. The article provides detailed information on the content of the kit.

FH

LENNOX, J.E. - ENGLISH, L.M.

Build Your Own Incubator

The American Biology Teacher, 40, 1979, No.6, pp.375-377, 2 figs., 2 tabs.

The authors describe an inexpensive and simple incubator, which can be used for biology teaching. A diagram of the incubator is provided. For temperature control a simple aneroid thermostat is used and an electrical fan provides air circulation. The authors describe the work on building the incubator in detail. The stability of temperature in the incubator was tested with a digital multimeter Tektronix DM 501 under stable conditions. The measurement findings are summed up in a table. Also the effectiveness of the incubator was tested with 45 Petri dishes with a cultivating medium. The incubator can also be used for hatching chickens, for chemical experiments and in microbiology.

RA

NASH, P. - MAHAN, C.
A Simple, Inexpensive Restraining Device for Small Animals
The American Biology Teacher, 40, 1978, No.9,pp.569-570.
2 figs.

In this article the authors describe a restraining device developed for microbiological studies. The dimensions of the device can be set according to need, i.e. according to the type of laboratory animal used. Essentially, the device is made of two boxes, with boxtops, which have slots, through which the animal's tail is put. The experimentor is then able to hold the animal in place by the tail. The whole device is described in detail, its methods of manipulation, etc. In the final part of the article the authors describe their experiences with the device, which is especially useful for beginners. There are useful photographs attached.

RA

10.9.4 Measuring instruments

FRANYO, I.
Az SI és a biológia tanítás (The SI system of standards and measurements in biology teaching)
A biológia tanítás, 17, 1978, No.3, pp.69-70.

On the basis of practical examples the author explains the necessity of using SI standards and measurements also in biology teaching.

10.9.5 Apparatus for projecting pictures and for reproducing sound, film projectors, slide projectors, epidiascopes, overhead projectors, tape recorders, radios, phonographs, radio-phonographs and video-recorders

BAUMANN, K.
Microteaching als Instrument der Lehrerausbildung
(Microteaching as a medium for teacher training)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.6, pp.164-165.

The idea of microteaching with the aid of a video-recorder was developed in 1961 by Acheson. It has become widespread in the USA as an important element in teacher training. In the Federal Republic and in Austria this method is not widely used because of the high price of the instruments needed. The author reports that in teaching through the microteaching method it is possible to organise brief courses for small groups. This method also makes it possible to analyse the behaviour and methods used by the teacher and to deminish the errors, losses and mistakes made in the course of teaching. It makes it possible for the student teacher to assess his own performance and to improve his self-control. It does not, however, represent a universal cure against all negative aspects of school work. A portable video-recorder in the Federal Republic costs 7 to 8 000 DM. In the USA the students of teacher training colleges are able to rent the recorders at 1 dollar per hour.

AA

HERTZLER, E.C.
Tape Tutor - Assisted Instruction
The American Biology Teacher, 40, 1978, No.5, pp.272-274, 2 figs., 2 tabs. Lit.4.

The author cites his own experiences with the use of a tape recorder tutor during class work. In the introduction the author sums up the history of the use of cassette tape recorders for tutoring in school and the advantages of this method. The basic criteria set for various teaching instruments include their low price, safe operation, resillence, multiple use and others. The so-called tape tutor fulfils all these requirements. The pupils first listen to the tutor and answer questions during pauses. Then they answer the questions in a test. On the basis of numbered pushbuttons they select the correst answer. When the answer is correct, the word "yes" appears and the pupil continues. When the answer is wrong, this word does not appear and the pupils must select a new code, or listen again to an explanation of the given question. The article also contains an outline and a photograph of the instrument.

HA

POENICKE, H.-W.
Mikroprojektion und ein exaktes mikroskopisches Zeichen ohne teuere Zusatzgeräte - ein Vorschlag zur Selbsthilfe bei knappen Etat (Microprojektions and precise microscopical drawings without expensive supplementary devices - suggestions for self-help with a tight budget) Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.4, pp.107-110. 5 figs.

Microscopical objects can be projected in a class room with the aid of a slide projector, a strong light and an ordinary school microscope with a mirror and capacitor. The author has designed a fitting for projections which makes it possible to project an object on the focusing screen, so that a number of people can observe it. This procedure makes it possible to draw an outline of the projected image. The author points out that generally speaking, schools suffer from a shortage of microscopes. Also microprojectors and rooms which can be darkened are in short supply. In the best of cases the teacher himself demonstrates an original object in a microscope. A projection fitting for a microscope is expensive; it costs 1000 DM.

AA

10.9.6 Optical apparatus, magnifying glasses, mounting magnifying glasses, microscopes, exposure meters, photographic cameras

ROSS, F.C. - SMITH, R.J.
Teaching Depth of Field Concept
The American Biology Teacher, 40, 1978, No.1, pp.43-45, 5 figs.

The article deals with the problem of explaining the concept of field depth, which is the foundation of correct microscopy. A Petri dish is used for a demonstration, where on the inside the word "Up" is written and the word "Down" is written on the underside of the dish. The dish is then placed on an overhead projector (Meotar, Polylus) and the words are gradually focused on. The same principle can be demonstrated directly under a microscope with a slide which has a line drawn on both sides of it. In conclusion, the authors show how to use this excercise during the microscope observations of bacteria, protozoa and algae. The text is accompanied by photographs.

10.9.7 Premises for teaching and keeping aids and equipment (biology rooms, biology laboratories, biology stock rooms), displays of natural specimens, museums

MARSISKE, H.

Behandlung des Stoffgebietes Abstammungslehre im naturkundlichen Museum (Teaching topics on phylogeny in a natural science museum)
Biologie in der Schule, 28, 1979, No.6, pp.236-243, 1 tab.

Museum expositions are not sufficiently utilized for the purpose of biology teaching - and this is also true of the Natural Science Museum in Berlin. The concept of its work is now concentrated on problem teaching. The author discusses the teaching of the following topics in this context: "Factors of Evolution", "The Influence of Selection and the Outcome of this Influence on Populations". Worksheets are used in teaching and the author describes in detail their concept and methods. Methods suitable for problem teaching are also discussed in connection with the following subjects: "Isolation as an Evolutionary Factor", "Specialization and Regression as Factors in Phylogeny", "Homologous Organs", "The Development of Fossils and their Study", "Transitory Forms in Vertebrates" and "From the Family Tree of Mammals".

FH

MARSISKE, H.

Behandlung des Stoffgebietes Abstammungslehre im naturkundlichen Museum - III. (Teaching topics on phylogeny in a natural science museum)

Biologie in der Schule, 28, 1979, No.11, pp.467-471, 4 figs.

The author here discusses the topics "The Status of Man in Nature and Society", "Biological Characteristics of Man and Primates" as they are taught in a museum. He cites examples of worksheets used and their relation to the exhibits in the museum. In the first worksheet the pupils solve problems related to the position of man in nature and society and the biological characteristics of man and primates, while the second worksheet relates to the development of man from animal ancestors.

FH

PRONIN, V.S.

Iz opyta raboty po sozdaniyu uchebnogo kabineta

(From the experiences of organizing a school study center)

Biologiya v shkole, 53, 1979, No.3, pp.49-51, 3 figs.

The author characterises 5 stages connected with the organization of a study center in a school. The author considers usefulness, simplicity and aesthetical qualities as being most important. The study center has exhibition cases and book shelves which are organized according to sections of the syllabus and contain textbooks, scientific and methodological literature and periodicals. The center also has bulletin boards which serve for an exchange of information, a collection of indoor plants and a "corner of living nature". The author describes in detail the furnishings of the center and the organization of its activities.

FH

VAVILOV, V.S.
Nash muzey (Our museum)
Biologiya v shkole, 53, 1979, No.1, pp.62-63.

The school nature museum described by the author has more than 1300 exhibits which are connected to the development of the Urals and Siberia - their geology and flora and fauna. It contains a number of collections, herbariums, stuffed animals, skeletons, summary tables of data, albums and scientific literature. The pupils, under the supervision of their teacher and with the help of their parents, have substantially contributed to the study center.

FH

11.1 Survey of organizational forms of biology teaching

ALTMANN, A.
Kooperační formy výuky biologie (Cooperation forms of biology teaching)
Přírodní vědy ve škole, 30, 1978/79, No.7, pp.243-244.

Cooperation forms are a method of cooperation between pupils in solving a given biology problem and in exchanging information on biological subject-matter. The assignements given to pupils are determined by the educational and teaching aim, by the content of what is being taught, by the method and organizational form of teaching and by the number of pupils in a class.

The most frequent cooperation form is the direct (frontal) teaching of biology, which is characterized by the direct supervision of the teacher and the receptive activity of the pupil. In other cooperation forms - such as individual teaching, partnerships in learning, teaching in groups and sections of the class - the pupils work independently and are responsible for their own work.

VČ

11.2.1 Laboratory work

FEIRO, A.D.

The Rhizosphere

The American Biology Teacher, 40, 1978, No.1, pp.50-52, 64, 3 figs., 3 tabs., lit. 11.

The article deals with the variety of life in the soil. The author first defines the rhizosphere - the layer of soil as far as plants reach with their roots. A study of the root systems of indoor plants is a good excercise for laboratory work in class. A block of soil 6.35 x 6.35 x 12.7 cm is recommended. The author describes suitable procedures. A root bundle, together with the soil remaining on the roots, is placed into a sterile conical flask and weighed. After adding sterile water, the soil is washed away, the roots are dried and weighed. The high sterility of all instruments and aids used is very important in this work. The soil solution is further diluted and placed on agar or another cultivating medium. The incubation of baceteria then takes place. Finally the students determine the population density of bacteria per gram of water.

RA

JANTZEN, P.G.

The Origin and Nature of Race: A Values Clarification Lesson

The American Biology Teacher, 40, 1978, No.9, pp.532-533, 562.

In spite of the fact that all humans are considered to be members of a single species, there exist differences between them. These differences are important, because they form the background to many historical conflicts and have contributed to the cultural development of mankind. The author discusses the problem of races. He compares some definitions and considers the origin of contemporary races. The term selection is explained as a process in which the population adapts gradually to given living conditions. As an example, the the author compares the significance of pigmentation and the size of body protrusions (for instance the nose) for life in hot and cool climates. Another problem which the article deals with is gene drift, migration and the mixing of populations. The latter is supported by the opportunity to freely chose a spouse in marriage. When this choice is limited to persons living in the vicinity, those who speak the same language, have the same religion, belong to the same social group, etc., then the mixing of populations slows down. Thus there are factors which support the mixing of the races and conversly those which lead to a certain isolation which maintains them. After this general introduction, the author cites an excercise during which pupils, divided into four-member groups, answer questions concerning the human population.

RA

HUMPHREYS, D.W.

Teaching by Inquiry

The American Biology Teacher, 40, 1978, No.7, pp.435-437. 3 figs.

The great majority of curricula and syllabi in use today are based on the principle of scientific inquiry. But students usually do not have much opportunity to become acquainted with the actual process of scienrific research. Usually they become acquainted only with its findings. The author suggests various laboratory excercises, which provide students with opportunities for penetrating the secrets of scientific research. One excercise is called "The Phenomenon of a Bent Wire". The experimental person holds on to two ends of a wire bent in a right angle. The ends of the wire are directed in a forward direction. When the person walks over a metal object the electrical charge goes through the lower part of the legs and the wire ends will drop and cross. The whole course of the experiment is described in detail and it is explained on the basis of electro-statical forces.

RA

HUNT, J.W.
Algal Biochemical Tricks and Classification
The American Biology Teacher, 40, 1978, No.9, pp.528-531, 562, 1 fig., 4 tabs.

The article provides suggestions for laboratory work concerning algae. The aim of the excercise is to demonstrate the basic classification of water algea into four groups: Chlorophyta, Cyanophyta, Phaephyta and Rhodophyte. The criteria for including an algae into a specific group include its colouring, the structure of the cell wall, its reproduction characteristics, etc. In the excercises described in the article the students study marine algae. The first criterion for classification is pigmentation, others include the nature of nutritional values, the composition of the cell wall, ciliates, and other cellular details. The author deals in detail with the basic classification of algae. In the subsequent part of the article instructions for laboratory excercises are given, including the use of chemical reagents, etc.

HA

KASTOVA, Z.B.

Laboratornite zanatiya po temata "Kletka" v X. klas
(Laboratory work on the topic "The Cell" in the 10th class)
Biologiya i Khimiya, 22, 1979, No.4, pp.27-32, 2 tabs.

Laboratory work is an organizational form of the educational and teaching process in which the method of observation and experiment prevails; conversations or discussions are only supplementary forms. In the first lesson on the subject of the cell the author deals with the function of the cell wall. The laboratory excercise begins with a discussion in which the pupils are given the problem they will then work on - where they will be asked to give answers to questions or to formulate a hypothesis, which will then be verified. One such important questions is how cells behave in a solution of various concentration. Pupils write their findings into a prepared table, which is then analysed in class. In the second lesson, entitled "The Semi-permeability of the Cell Wall" the pupils study the reaction of a flower to solutions with various pH. The facts thus gained provide proof that the cell wall plays an important role in the regulation of the inner environment of a cell, which represents the homeostasis mechanism. Laboratory excercises should be done immediately before the lesson concerned with the topic "Basal Metabolism Between Cells and Their Environment". The experimentally determined facts on the structure and function of the cell wall help to formulate conclusions concerning the relation between an organism and its environment.

LR

McCARTER, S.M.
Demonstration of Zoospore Activities by Fungi
The American Biology Teacher, 40, 1978, No.8, pp.484-486, 497, 2 figs.

The author describes several suggestions for laboratory excercises concerning zoospores (movable spores, by which some of the lower fungi reproduce). In the introduction, a survey of fungi research of the order Phycomycetes is given, especially the family Pythiaceae and the family Pythium and Phytophthora. The morphology of their sporangium is analysed and the characteristics of zoospores. Another section of the article deals with work procedures and their assumed outcome. The specie Pythium aphanidermatum is considered to be most suitable for school experiments. The conditions for its cultivation are described, as well as methods for the stabilization of a culture. Also a method for producing zoospores is described, their observation and the recording of findings. Their external structure is studied, as well as their stages of growth and the relation of zoospores to plant roots. In conclusion, the author cites possibilities for further experiments with zoospores which concern their affinity with cultivated plants and the mechanism of this affinity.

RA

MADRAZO, G.M. Jr. - HOUNSHELL, P.B.
Photoperiodic Treatments in Morning Glory: A Laboratory Investigation
The American Biology Teacher, 40, 1978, No.8, pp.480-483, 497, 2 figs.

In the article the authors describe their experiences with the use of the Morning glory to demonstrate photoperiodism in school. In the introduction, the authors stress the advantages of using living plants of the Convolvulaceae family and also briefly the problem of photoperiodism as the reaction of the organism to the relative length of day and night. During the laboratory excercise itself the pupils concentrate on the following questions: what is the relation of biological time to the process of blooming; why do trees which grow close to street lights behave differently from others; what is the relation of photoperiodism of plants to their environment; why plants do not react to red and infrared light; can man control the process of blooming? Individual problems are discussed in the article and excercises on the induction of photoperiodism, the effects of hormones and the quality of light and temperature are described in detail.

RA

TAMIR, P. - LUNETTA, V.N.

An Analysis of Laboratory Inquiries in the BSCS - Yellow Version

The American Biology Teacher, 40, 1978, No.6, pp. 353-357.
4 tabs., lit. 12.

The article deals with the increasing importance of laboratory excercises in school curriculums. The authors attempt to define an improved outline for carrying out an analysis of school laboratory research, on the basis of the 3rd edition of the so-called yellow version of the Biology Science Curriculum Study and to discuss the outcome of this analysis. The methodology of the study and its outcome is cited in detail. The authors have concentrated especially on the frequency of laboratory excercises in various subjects, as well as on the organization and integration of laboratory excercises into their subject. They cite examples of the categories used in the project and sum up the findings in terms of frequencies and percentages. The analysis has shown the existence of three basic negative aspects: students do not know how to define a problem, they have too few opportunities to suggest methods and means for carring out a project and discussions after the completion of the laboratory work are almost non-existent.

VIGUE,C.L.
Procedure for the Quantitative Assay of Enzymatic Activity.
The American Biology Teacher, 40, 1978, No.7, pp.438-440. 1 fig.

The article describes laboratory excercises in which the oxidase activity of aldehyde in wild and mutant fruit flies (Drosophila melanogaster) is measured on the basis of quantitative tests. The oxidase catalyses the transformation of acetyl-aldehyde into acetate acid. If phenazine methosulphate and 2.3-dichlorphenolinphenol are present in the tested solution, then the latter substance is recuced and the blue coloured substance turns colourless. The solution remains yellow due to the influence of the methosulphate. The reduction can also be explained as an increase in frequency. How to proceed in the experiment is described in detail.

RA

11.2.2 Practical work in biology, biology seminars

GOTTFRIED,J.
An Excercise Using Lichens as Indicators of Air Quality
The American Biology Teacher, 40, 1978, No.1, pp.47-49.
2 figs., lit. 12.

The article describes the possibility of using living organisms as indicators of air quality - for instance lichens are suitable for this purpose. Reasons are given to show why lichens are particularly well suited for this purpose and the principle upon which their sensitivity to air pollution is based. Practical excercises are described. The pupils should first become acquainted with the basic morphology and systematics of local lichens. Then field work is undertaken and the lichens collected, identified, their diversity determined from at least three localities. In conclusion, methods for determining air pollution are described. The article also describes in detail a project undertaken at Oregon State University where the localities of the lichen chosen were ten-year-old oak branches. The students worked in groups of three and in the assessment stage they used a computer program which is attached to the article. In conclusions, possibilities for adapting the program are described.

RA

JURČÁK,J.

Rostliny rodu tenura jako vhodný materiál pro praktické cvičení (Plants of the Tenura genus as suitable material for practical excercises).

Přírodní vědy ve škole, 30, 1978/79, No.4, pp.125-130, 11 figs.

The article provides detailed instructions for the complex microscopy of plants of the genus Tenura in practical biology excercises, in general education secondary schools. Microscopical observations can be carried out on cross sections of the roots, shoots, leaf, floral axis and the findings can be compared with previous knowledge in morphology, physiology, ecology and what is known of the practical use of these plants. Also some physiological experiments can be undertaken. If the plants of this genus are cultivated in the school as decorative indoor plants, material for the experiments is always available. From this point of view, the genus Tenura is much better than the hyacinth (Hyacinthus orientalis) which is often used for this purpose and which must be cultivated with temperature control to obtain good results. The drawback of the Tenura plants is their sporadic blooming, which limits the study of cross sections of the floral axis and analyses of inflorescence and blooms,

VČ

KOMANOVÁ,E.

Praktikum z botaniky - příručka na pomoc učitelům při realizaci nového projektu československé výchovně vzdělávací soustavy (Practical excercises in botany - a handbook for teachers for carrying out the new project of the Czechoslovak educational and teaching system).
Přírodní vědy ve škole, 30, 1978/79, No.7, p.249.

The article acquaints the reader with a new manual written by Hana Střihavková, called "Practical Excercises in Botany". The handbook is written for natural science teachers who teach botany in the 5th class of basic school. Some of the excercises of a bio-chemical nature can also be used for teaching general biology in the 7th class.

VČ

PATTERSON,R.

A Classroom Project on Threatened Animals
The American Biology Teacher, 40, 1978, No.9, pp.570-571. 1 fig.

The author acquaints readers with biology excercises he undertook with his class. When explaining the distribution of animals, he found that the geographical distribution of the specie Gopherus agassizi, which is a threatened specie in the state of California, is not known. The pupils began to gather information on the incidence of this turtle with the help of herpetological journals, the California Administration for Fishes and Game and other local sources. Data thus obtained was recorded on geological maps, the data was verified and supplemented from other sources. Inquires were sent to schools, museums and reservations in the vicinity of places where the animal was reported.

RA

11.2.3 Hobby clubs

BERASHEVICH,I.M.- ISURINA,R.I.
Razshireniye znaniy uchashchikhsya o narodnokhozyastvennom znachenii rasteniy /The extension of pupils´ knowledge on the importance of plants for the national economy.)
Biologiya v shkole, 53, 1979, No.6, pp.56-59.

In botany teaching, a great deal of attention is devoted to the practical use of plants and their importance for the national economy; the authors document this on the basis of practical examples. The same is recommended for hobby club activities. The teacher of one such hobby club in Vitebsk included the problem cited in the title into the plan of activities of the club on a larger scale than is required by the syllabus. The club had 20 pupils from the 5th and 6th classes and met three times a month. The pupils became acquainted with local flora and organised excursions to factories. The pupils also carried out practical excercises with plants (for instance the extraction of colouring agents, obtaining fibres, the extraction of essential oils and turpentine).

FH

BOLAY,E. - ZUCHT,B.
Anregungen zur ganzheitlichen Betrachtung von Säugetieren im Rahmen einer Arbeitsgemeinschaft (Incentives for the general observation of mammals in the framework of a hobby club).
Der Biologieunterricht, 15, 1979, No.4,pp. 24-44.

The most extensive learning topic in zoology are the vertebrates, which are taught within the framework of zoology in the 5th class and the human biology in the 10th class of secondary school. However, the subject is also taught in other classes and in a diverse manner, either monographically, or from the point of view of ecology or morphology and anatomy. The author analyses the opportunity to deal with this problem from the point of view of the didactics of biology. Small mammals can be kept in schools - they can be caught during field excursions. Those which are killed should be preserved. Some animals can be used as experimental animals for physiological experiments, or experiments concerning ecology. The author shows how to classify animals and how to make osteological and dermatoplastic permanent specimens, specimens mounted in acrylate and histological or microscopical specimens.

AA

DUNDA,K.

K pojetí přírodovědné části systému PO SSM (K 30. výročí založení Pionýrské organizace) (Concerning the concept of the nature-study part of the system of Young Pioneer activities - at the occasion of the 30th anniversary of the founding of the Young Pioneer Organisation of the Socialist Union of Youth).

Přírodní vědy ve škole, 30, 1978/79, No.4, pp.132-133.

The content of hobby club activities of the Young Pioneer Organisation of the Socialist Union of Youth are in the main determined by the complex educational program, which contains a manadatory part, according to which all children of Young Pioneer age work and an elective part, which children chose on the basis of their individual interests. The mandatory part of the nature-study program concentrates on socially beneficial activities, care of the environment and a knowledge of nature and its conservation. The nature-study program of the elective part of the Young Pioneer program concentrate on the conditions necessary for gaining a Young Nature Scientist Badge of the Ist and IInd degree.

VČ

EFREMOVA, P.

Zakluchitelno krzhochno zanatiye na tema "Chovekt i negovata zhiznena sreda" (A final assignment for a hobby club: "Man and his Environment")
Biologiya i khimiya, 22, 1979, No.5, pp. 49-50.

In the hobby club, which the author supervises, the members are pupils from the 9th class. The hobby club is a form of teaching, which aims at extending and improving knowledge in biology, as an extension of the syllabus. An important task of the hobby club is to increase the interest of pupils in the natural sciences. The work of the hobby club is divided into four parts:

1. Explaining the structure of the eco-system;
2. Mutual relations of organisms in the bio-cenosis;
3. Energy flows in the circulation of matter;
4. Human activities, in view of maintaing natural equilibrium.

The pupils receive a bibliography of sources for these topics.

GEISS, R.

Veränderungen des Biotops Röthelbach und Röthelbachwiher innerhalb von 8 Jahren. (Changes in the biotope of Röthelbach and Röthelbachweiher in the course of 8 years).
Praxis der Naturwissenschaften-Biologie im Unterricht der Schulen, 28, 1979, No.9, pp. 227-234. 3 figs, 5 tabs.

The author reports on the work of a voluntary hobby club devoted to biology at the Annet Koll general education secondary school in Traunstein in the school year 1977/78. The group studied changes which occured in the biotope of Röthelbach and Röthebachweiher near Traunstein. G. and I. Bauer studied the chemical aspects of water, including the hardness of water, its carbonate hardness and pH values and the content of ammonia, nitride, phosphate and iron ions. They found that with a declining hardness of water, its pH content increases, and vice-versa. Assimilation disturbs the carbonate equilibrium of water by taking away CO_2 (the higher green plants). Temperatures were compared with observations under_taken in 1969/70 and in 1977/78. Also information is provided on the general present state of the waters studied, their plankton, very young plants and their influence on the biotope in recent years. Swans have recently appeared, causing a great deal of damage to the biotope (to reeds, by polluting the water with feathers and feces, by disturbing the nesting of other birds, by decreasing the number of toads and frogs, as well as other amphibians and the variety of water plants). The article provides interesting ideas for the work of a hobby club outdoors.

AA

YANIN, G.I. - STOLNIKOV, A.F.
Proverka kachestva privivok sdelanikh uchashchimsya
(A verification of grafts carrie out by pupils)
Biologiya v shkole, 53, 1979, No.6, p. 62.

Grafting requires a good knowledge of the technique. For the purpose of verifying the quality of the grafts made by pupils, the authors recommend cultivating them indoors. This method was used by pupils in the biology hobby club in Melitopol. The authors describe how suitable grafts were chosen and which method of grafting were used by the pupils.

FH

YEVSTAYEV, Y.V.

Kruzhok yunikh biologov zooparka. (A biology hobby club at the zoological gardens).

Biologiya v shkole, 53, 1979, No.4, pp.63-67. 1 fig.

A hobby club of young biologists at the Moscow Zoological Garden is one of the oldest of its kind in the USSR. Its first meeting was organised in April 1924 with 57 pupils. The author cites various facts from the club's history and its various activities. At present it has 60 members who are pupils from the 5th to 10th classes - they meet twice a month. They deal not only with theoretical problems, but also have practical seminars (the classification of animals, methodologies of observations, working with books). The author cites various information about the activities of the club (during 55 years of existence its former members include 44 doctors of science and 81 candidates of science).

FH

KELEBERDA,I.N.

Nash botanicheskiy kruzhok. (Our botanical hobby club).

Biologiya v shkole, 53, 1979, No.2, pp. 63-65, 3 figs.

The botanical hobby club of the Rostov Regional Station of Young Natural Scientists has 75 members who are pupils in the 5th to 10th classes. They study the flora of their vicinity, how it adapts to changes in the environment, the influence of various ecological factors on the growth and development of plants, etc. The primary task of the Station is to arouse in young people an interest in nature. One of the most interesting activities of the station is the study of a steppe cenosis - which the author analyses in detail. This activity takes up a whole year and in each vegetation period has different aims. The frequency of various plant genra in the vicinity is graphically represented by a circle diagram.

FH

MÄRZ, H.
Fachzirkel einmal anders. (About hobby clubs - this time differently).
Biologie in der Schule, 28, 1979, No.2-3, p. 104.

Every teacher tries to explain to pupils the resolutions of the IXth Congress of the Socialist Unity Party of Germany. A specialized committee in Görlitz has organised a central hobby club at the regional hospital which is active in this area. The author first clarifies some medicinal aspects, which pertian to the club's activities (caring for prematurely born babies), analyses the moral and ethical aspect of this activity and its relation to the biology syllabus.

FH

MINCHEVA, M.K.
Krzhochna rabota vrkhu izvlichane na prirodni bagrila.
(A hobby club activity for the extraction of natural dyes).
Biologiya i khimiya, 22, 1979, No.4, pp. 55-57. 1 tab.

An interesting experiment, which is suitable for the work of a hobby club in the 10th class, is the extraction of plant dyes. The dyes are extracted in a water solution and their reaction to inorganic acids is studied. The pupils make up a table of natural objects from which dyes can be obtained and then determine the colour they produce in a water solution, in ethylalcohol and in a 1% solution of HCl acid and methylalcohol and also the colour of the relevant inorganic salt. The author also describes several experiments to prove the quality of the dyes, which are attractive for pupils and strengthen an interdisciplinary relationship with chemistry.

LR

NAUMOV, V.M.
Opit organizatsii klubov yunikh druzey prirodi v Irkutske.
(Experiences with the organization of a club of young friends of nature in Irkutsk).
Biologiya v shkole, 53, 1979, No.6, pp.50-54, 1 fig.

The club of young nature friends in Irkutsk has been in existence for more than 8 years. It has 800 members and is led by a council which has 30 pupils in it from the 4th to 10th classes. The various club sections cooperate with the staff of the forestry enterprises in the vicinity and with the students and teachers of institutions of higher learning found in the city. The author describes various activities which the club undertakes- they mostly concern nature conservation, the organisation of summer camps, and field work.

FH

USHAKOV, V.A.
Nauchnoye obshchestvo uchashchikhsya. (A scientific society of pupils).
Biologiya v shkole, 53, 1979, No.1, p. 65.

The department of zoology at the Gorki University in 1969 founded a zoology section of a scientific society of pupils. Its aims and purpose differ from that of an ordinary hobby club. Its basic purpose it to teach school children the basic methods of scientific research - how to experiment, work with books, how to formulate conclusions. Two basic forms of work are used: group work in seminars and individual work. 20 - 30 pupils work in the section each year.

FH

VASYUKOV,I.L. - KOSIVTSEV, V.V.
"Golubiye" patroli Volzhskogo. ("Blue" Volzhski patrols).
Biologiya v shkole, 53, 1979, No.1, pp. 54-58.

Until 1976 there were several groups of "blue" patrols in the town of Volzhski, but their activities were limited to propaganda and patrolling the town; their activity was more of a chance nature and sporadic. After a conference held in 1976 (in which 749 members participated, from 29 groups of "blue" patrols), the situation improved. A conference of patrols from the whole town, which is organized once a year, has become the highest body of these "blue" patrols; they are headed by a municipal headquaters - the activities of which the authors describe. They also describe the activities of production teams made up of pupils. In conclusion a list of tasks undertaken by the "blue" patrols in the course of the last two years is described, as well as a list of theoretical and practical assignments given to members, and suggestions for excursions outdoors.

FH

WEISZ, W.
Erfahrungen einer Arbeitsgemeinschaft Sozialistische Landeskultur. (Experiences with the activities of a hobby club concerned with the forming of the landscape and nature conservation).
Biologie in der Schule, 28, 1979, No.7/8, pp. 336-339.
6 photos.

Problems of the forests and forestry economy are the main focus of interest of a hobby club at the Young Natural Scientist Station in Franfurt am Oder in the G.D.R. The purpose of the hobby club is to learn to take care of the forest. The author cites various assignments given to the pupils, how they were fulfilled and the problems which the hobby club is planning to deal with in the future.

FH

WIPER, H.S.

A Club Model That Works.

The American Biology Teacher, 40, 1978, No.7, pp.439-440.

The author describes his experiences in the supervision of a biology club which was founded 17 years ago at a high school in Newton. In September, at the beginning of the academic year, there is a call for joining the club. Information is sent to various schools and directly to teachers and also placed on bulletin boards in the vicinity of schools. Those interested in joining are asked to fill in a questionnaire, where they describe their own interests. On this basis various sections of the club are organized. Individual sections are supervised by various teachers, parents or older students. The article also describes the Statute of the club, summed up in 8 points. Each section works independently, but some parts of the club's program may be common. Each club member recieves a monthly newsletter. At the end of the year, those who participated in club activities receive a diploma. A small sum is charged for enrollment. The author also cites, as an example, some of the projects undertaken by various sections, which include a botany section, a marine flora and fauna section, a zoology section and a Red Cross section. For all members of the club there are also annual common tasks, such as a competition called "What Is ...", where various prizes are awarded. At the end of the year there is a meeting in which all club members participate.

RA

11.2.4 Biological discussions

JEZHOVA, F.N.

Konferetsia po biologii v nashey shkole. (A conference on biology held in our school).

Biologiya v shkole, 53, 1979, No.6, pp. 59-61.

Among the prerequisites required of pupils for participation in the school biology conference are a knowledge of how to work independently with literature and how to use ostensive aids. These skills are gained gradually. In the 5th to 6th classes, pupils learn how to formulate the main ideas found in a text and in the 7th and 8th classes they learn to work with a more complex text in which various problems are followed. Biology conferences begin to be organised from the 6th class onward. The author provides more detailed information on a conference on the topic "Do we know everything about algae?"

FH

KAYTSMAA, L.

Den biologii. (A Biology Day.)

Biologiya v shkole, 53, 1979, No.6, p.61.

A Biology Day is one of the forms of extra-curricula activities. During the first term of the school year, the pupils write on pieces of paper their wishes and suggestions, which are then judged by members of the school biology section, made up of pupils from the 7th to 10th classes. The first topic of the Biology Day described in the article was information on the agriculture of the region, the second topic concerned the forests of the region and nature conservation. The author describes the preparations, content and organisation of these activities.

FH

NIKISHOV A.I.
Biologicheskiye vechera. (Biological evenings.)
Biologia v shkole, 53, 1979, No.1, pp.59-62.

One of the forms of large-scale extra-curricula activities are biological evenings, which in recent years have become very popular. Testimony to this fact is in the large number of articles which the journal Biologiya v shkole has received on this topic - the author cites a number of those which have been published. In the organization of such evenings, the experiences gained from reading these article were profitably used. The evenings sometime concern very broad topics and sometimes rather special ones. Often the evening will include literature or the arts.
A negative aspect of these activities is that the specific characteristics of varous age groups are not always taken into account, as can be seen from the fact that very complex terms and expressions are used.

FH

VLKOVA, V.
Darvinova vecher. (An evening with Darwin).
Biologiya i khimiya, 22, 1979, No.5, pp. 51-52.

Biological facts and phenomena are taught to pupils in the light of evolutionary theory. The founder of this theory, Charles Darwin, represents such an important benchmark, from the point of view of ideology, as well as the development of biology itself, that he deserves more attention than be received in the syllabus. The author decided to devote a whole evening program to his life and work. The preparation of the program for the evening required the study of various literary works, writing a scenario, gathering suitable pictures and inviting guests. All pupils in the ninth classes and all members of biology hobby clubs were invited to come. The scenario included the following:

1. The university at Oxford
2. Charles Darwin's origins and education
3. The purpose of the journey of the Beagle
4. The years spent in London
5. Darwin's theory of the evolution of organisms
6. The significance of Darwin's scientific work on the evolution of organisms and its impact on teaching.

LR

SOLOVYEVA, P.P.
V mire lekarstvennikh rasteniy. (In the world of medicinal herbs).
Biologiya v shkole, 53, 1979, pp. 458-461.

The author describes the organization and course of a school meeting on the subject cited in the title. The evening was prepared by a teacher and 10 pupils, who prepared a sketch on medicinal herbs in which one of them played a physician, and did all the other work in connection with the meeting.

FH

11.3.2 Excursions and camping out

ADAMSKA, Z.
Wycieczki ekologiczne - konspekt dla kl. V. (An ecologial excursion - an outline for the 5th class).
Biologia w szkole, 32, 1979, No.1, pp. 35-37, 1 fig.

The author provides the outlines of plans for organizing two excursions for the 5th class of basic schools; one in the spring to a nearby lake and the second to a forest. For each excursion a list of media is provided, as well as the aim of the excursion, safety rules and regulations, providing individual groups of pupils with various assignments and how the pupils should write about what they see. During the course of the excursion to the lake described, the pupils studied various marsh plants growing on the banks of the lake, as well as those which grow submerged in water. They also observed various fauna in the lake. During the excursion to the forest they studied abiocenotic and biocenotic factors, the moisture of the soil, light in the forest, air flows, temperature, the specie composition of various levels of the forest and the animals which live in the forest.

In the conclusion of both excursions, the pupils were asked to sum up the new knowledge they acquired and to classified the specimens they collected. Some of the animals they caught were set free again, while others were taken to the school for breeding or further preservation.

AA

BOGSCH, I.
Szakmai tanácsok az állatkerti látogatások bezetéséhez - 8. osztály. (Methodological advice for visits to the Zoo - in the 8th class).
A biológia tanítása, 17, 1978, No.2, pp.41-43.

The author discusses the knowledge which pupils and teachers should have before undertaking an excursion to the Zoo, especially from the point of view of man as the final development stage of mammals.

CABARAT, M.

Une journée d'excursion écologique, pédagogique, géologique à 50 km de Paris. (One-day ecological, pedagogical and geographical excursion in the vicinity of 50 km from Paris).

Biologie, Géologie, 66, 1979, No.3, pp. 445-447.

The author recommends taking pupils from large cities on frequent nature excursions for the purpose of studying nature - including aquatic environments, where pupils can observe the influence of the climate and other ecological factors, the dynamics of various living communities and also geomorphological observations. She cites what can be found in various natural environments, in the forests, meadows, in the vicinity of rivers, fish ponds, marshes, etc. The route of such excursions should be prepared well in advance, so that everything goes smoothly.

LR

HEGEDÜS, P.

Biológus szemmel a STUDEXPO'77. kiállításon. (The exhibition STUD EXPO'77 as seen by a biologist.)

A biológia tanítása, 17, 1978, No.2, pp.50-51.

An analysis which concentrates mainly on an assessment of two and three dimensional biological models exhibited by various firms and institutions, especially, those which are already available.

KÁDÁR, Z.

"Bemutató Afrika állatvilágából" c. kiállitás pedagógiai tanulságai. (Pedagogical comments on the exhibition "The World of Animals in Africa").
A biológia tanítása, 17, 1978, No.1, pp. 23-26

An exhibition which acquaints children with the fauna of Africa, according to their geographical distribution. The author also describes various media used in the exhibition including films, slides and lectures .

KONONOVA, E. G.

Ekskursii v selskokhozyastvennoye proizvodstvo. (An excursion to an agricultural enterprise).
Biologiya v shkole, 53, 1979, No. 2, pp. 54-56.

Improving the effectiveness of educational work in a rural school and the forming of more close contacts between school and practical life can both be improved by organizing excursions to agricultural enterprises. Pupils become more interested in problems of economics, organisation and the specific aspects of agriculture. The author discusses the experiences of teachers in this area in the Kursk region. The basic excursion is organised to a large-scale greenhouse.

FH

RAKHMANKULOV, A.

Ekskursiya na zhivotnovodcheskuyu fermu. (An excursion to an animal farm).
Biologiya v shkole, 53, 1979, No.2, pp. 56-58.

At the All-Union Congress of Soviet Teachers, the resolution recommends that attention be devoted to improving polytechnical education, work education and vocational guidance. In a rural school, the polytechnical principle can best be implemented by acquainting pupils with the foundations of agricultural production. Many teachers like to organize excursions to animal farms. The author comments various problems connected with the organization of such excursions and devotes special attention to the assignments, which pupils should be given before the excursion and which should be based on their independent observations during the course of the excursion. The larger part of the article is taken up by a description of such an excursion.

FH

SHIBNEV, B.K.
Ekskursiya v shkolniy dendrariy. (An excursion to a school arboretum.)
Biologiya v shkole, 53, 1979, No.4, pp.40-43.

In the vicinity of the school where the author is a biology teacher, there is no botanical garden and thus the school decided to form its own arboretum. On an area of approximately 10 hectars, 70 various specie of trees and shrubs are cultivated, and the facility is used by the pupils of the 5th to 10th classes throughout the year. One such form of its use is an excursion, where the pupils receive specific assignments. The arboretum also serves for keeping various animals and for various zoological observations.

FH

WEISZ, J.
Bau und Anwendung eines Hangneigungsmessers für die biologisch-geographische Excursion in Klasse 9.
(The making and use of a clinometer in biological and geographical excursions in the 9th class).
Biologie in der Schule, 28,1979, No.2-3, pp.105-106.2 figs.

The author provides technical instructions on how to make a clinometer and how to use it. He analyses in greater detail various methods of its use - for instance for the measurement of various data and magnitudes.

FH

WYSOKIŃSKI, J.

Wędrowny obóz przyrodniczy dla uczniów szkół podstawowych. (Nature science camping excursions for pupils in basic school.)

Biologia w szkole, 32, 1979, No.3, pp. 138-139.

For a number of years the author has been using a new organizational method of biology teaching - he combines nature excursions with camping out with the pupils from basic schools. He describes his experiences with the pupils from Nowe Dvory Mazowecke. In 1978 the pupils camped out in the vicnity of the lake area between Augustowa and Gołdapi. The nature studies of the group concentrated on limnology, observing the colour of water (according to Forell´s scale), the acidity of water (with pH papers), the flora found in lakes and also becoming acquainted with the flora and fauna of the lakes. The author stresses the advantages of observing original objects outdoors. He recommends criteria for chosing suitable places for camping, concentrating work at sites where the objects to be observed are found and also comments the keeping of records and documents and making photographs.

AA

11.4. Biological Olympiads and biological competitions

FRONĚK, J.

Přírodovědné soutěže PO SSM k 30. výročí Pionýrské organizace. (Natural science competitions organised by the Young Pioneer Organisation of the Socialist Union of Youth at the occasion of the 30th anniversary of the founding of the Young Pioneer Organisation).
Přírodní vědy ve škole, 30, 1978/79, No.3, pp. 93-94.

The nature science competitions Biological Olympiad and Golden Leaf represent the culmination of the activities of hobby clubs devoted to the natural sciences among school children who are of Young Pioneer age. The Golden Leaf is a competition for groups or Young Pioneer squads which deals with various topics, including those which are the subject of hobby club activities. There are two categories in the competition: A for the 4th and 5th classes and B for the 6th to 9 th classes. The initial task given to competitors is to carry out socially beneficial work in groups and another task is gaining knowledge and conserving the natural environment. The culmination of the competition is the third assignment, which concerns a nature science trail.

In the biological Olympiad, individuals from the 6th and 7th classes compete, as well as those from the 8th and 9th classes. Other specialized competitions include The Golden Roebuck Trophy, The Golden Rod and Line, The Golden Bee Trophy and a competition for highest animal husbandry skills.

VČ

CHOMÁTOVÁ,M. - SVOBODOVÁ,M.
Do dalšího ročníku biologické olympiády na základní škole. (At the beginning of the new Biology Olympiad in basic school.)
Přírodní vědy ve škole, 30, 1978/79, No.5, pp.171-172.

The 6th annual Biology Olympiad for basic school pupils has indicated that the quality of hobby club activities is very good, as has been made clear on the basis of the work submitted to the competition, both from the point of view of choice of subject-matter and the way it was dealt with. Of the 48 essays submitted to the competition in the national round, half concerned zoology, one essay concerned anthropology, three geology and the rest concerned botany or nature conservation.

In further years greater attention should be devoted to a selection of topics, as well as definition of aims and the formal structure of the assignments given individually by participants in the competitons.

VČ

11.6. Independent homework

RADKIEWICZ, J.
O pracach kontrolnych w wieczorowych szkołach licealnych. (Concerning assignments given to students of general education secondary evening schools).
Biologia w szkole, 32, 1979, No.3, pp.83-84.

The students of evening courses provided by general education secondary schools are given various home assignments, which are in written form and aim at extending the students' knowledge, as well as teaching them specific skills and approaches. Some of these assignments are connected with the finding, mounting and conservation of natural material or the making of photographic documentation. During this work, the students learn the methods of scientific research, how to use available literature and they learn to plan their own work in advance. Before completing the project they usually have consultations with their teachers. The assignments usually concern problems of the vicinity of the school. The author demonstrates this type of activity on the basis of the example of the general education secondary school in Górzyce. He also cites the topics of some of the assignments: "The park in Górzyce", "Xerophytous plants in Górzyce and its vicinity", "A verification of the incidence of nests of the white stork and the hatching of its eggs", "Observations of the development and life of the honey bee", etc. The assignments are always given to pairs of students and after completion the essay is copied.

AA

11.6.1 Independent work done by pupils

NIEMIERKO, M.
Samodzielna praca badawca ucznia. (Independent research done by pupils).
Biologia w szkole, 32, 1979, No.2, pp.70-75, 1 fig., 2 tabs. 2 graphs.

The author describes how it is possible to make use of the independent research done by pupils in biology teaching. Stress is placed on observations and experiments; specific examples of assignments given to pupils of secondary schools which make use of these methods are cited. Experiments are carried out in two groups (experimental and control) and pupils are asked to use statistical methods for verification and to use methods of graphical representation. An example cited concerns the observation of honey bees and the variability of their activity in various days.

11.8. Field work and summer natural science activities

LAZARO, T.R.
Urban Land Use and its Impact on Streams: A Field Excersise.
Science Education, 62, 1978, No.2, pp. 165-171, 2 figs.

The article describes a field excercise which deals with the influence of urban development on land. The aim of the excercise is to give students an opportunity to understand the effects of soil erosion and sedimentation which accompany various types of spatial and temporal interventions by man into the surface of the land. The development of water streams in areas where the floral cover has ceased to exist are described. The activities connected with the assignments are described in detail, as well as the aids needed, how to go about measuring, how to collect samples, the making of histograms, etc. In conclusion the author also cites some alternative hypotheses.

RA

SHTINA, E.A.
K voprosu o letnikh zanyatiyakh. (Concerning the problem of summer assignments.)
Biologiya v shkole, 53, 1979, No.3, p.29.

The author offers comments on the botany syllabus. She suggests that among the summer assignments listed, the making of a herbarium should not be included because the task is too difficult for most pupils, makes too many demands on their time and most important of all, it is in contradiction to the requirements of nature conservation.

FH

VOLKOVA, E.E. - DRUZHININA,N.N.

Iz opita organizatsii spetsializirovannogo lagerya truda i otdykha. (Experiences with the organisation of a special camp devoted to work and recreation).

Biologiya v shkole, 53, 1979, No.2, pp.65-67.

In 1976 a regional special camp for older pupils called "Ecology" was founded in the Sverdlovsk region. The camp has the following aims: the vocational guidance of pupils, extending their theoretical knowledge in biology and chemistry, developing skills needed in experimental work, the education of a rational conservation attitude towards nature, education towards active forms of utilizing knowledge gained in the natural sciences for the conservation of the natural environment and also gaining skills in the advocation of nature conservation. The authors also decribe the contribution made by various institutions to the running of the camp and also the structure of the camp.

FH

ZAKHLEBNIY, A.N. - SURAVEGINA

Polevoy praktikum po izucheniyu i okhorone prirodnoy sredi. (Practical fiels excercises aimed at a study of environmental conservation).

Biologiya v shkole, 53, 1979, No.3, pp. 55-59, 4 tabs.

The Laboratory for Education towards Environmental Conservation of the Academy of Sciences of the USSR, together with teachers from Moscow schools has, since 1974, undertaken an experiment whose aim it is to develop such forms and methods of pupils' activities which make a study of nature coincide with its conservation. For this purpose complex ecological excursions and field trips are organised which the authors describe in detail. The field excursions are organised at the end of the school year with groups of about thirty pupils, together with a biology teacher and a geography teacher and take several days. The project begins with various organizational measures, then various theoretical work, followed by independent work outdoors. After lunch there isarest period and then work on individual science projects. The authors describe in detail various forms of teaching, the organization of lectures and discussions, the routes taken by various excursions. The basic form of work is a group assignment; several specific examples are cited - for instance the study of the specie variety of woodpeckers and the influence of human intervention on their numbers. After the completion of the practical excercise, a conference is held on the subject.

FH

ZIPKO, S.J.
An Interdisciplinary Study of Nesting Birds.
The American Biology Teacher, 40, 1978, No.9,
pp. 546-552, 560, 11 figs, 3 tabs.

The article describes the subject-matter and course of a 10 day mini-course concerned with bird behaviour during nesting. During the course, elements of biology and work education are combined. In the work part, the students themselves make nest boxes and place then in suitable localities. The article describes in detail how to proceed and this is shown on photographs and drawings of the nest boxes. Also the methods used for chosing a locality are described and a list of aspects which the students should observe is given.

The most frequent inhabitants of the nest boxes are usually ducks, but also some owls or predators can be found among them. The article includes experiences with such activities in 1971, accompanied by graphs and tables. In conclusion the author acquaints the reader with methods for assessing the students' work, their own judgments and the interdisciplinary contribution made by the project.

RA

12. Planning the teaching of biology

HUNNESHAGEN, K.-H.
Zum prozessgerechten Planen der Stoffeinheiten.
(Concerning the process of planning groups of topics).
Biologie in der Schule, 28, 1979, No.12, pp. 510-514.

The VIIIth Pedagogical Congress repeatedly stressed that the quality of a lesson depends on its preparation and the planning of the teaching process. The aim of the article is to point out certain reserves which exist in this area. There are three levels of planning teaching: annual plans, the planning of groups of topics and the planning of an individual lesson. Research projects have indicated that the first two of these levels are usually neglected, in spite of the fact that for successful teaching they are necessary. Improving the quality of teaching depends, among others, also on the quality of planning. The author discusses the tasks which are dealt with in the planning of the teaching process and cites specific examples concerning plant physiology. In planning groups of topics the most important thing is to correctly determine the main function of individual teaching units - the author does this on the basis of the example of the topic "The metabolism of the plant cell". Planning also includes considerations on the purpose of the lesson (knowledge, convictions, experimental skills, ability to express oneself), as well as considerations on motivation and the function of various lessons.

FH

12.2. The teacher´s preparation for teaching, individual lessons and other forms of biology teaching

GUILLARD, C.E.

Un élément du patrimoine culturel: les paysages.
(An element of the cultural heritage: the landscape).
Biologie, Géologie, 66, 1979, No.1, pp. 77-80, 1 fig.

The author discusses methods with which to teach pupils in the 5th and 6th classes problems of the landscape and to analyse natural elements such as the relief of the landscape, hydrography, vegetation, the consequences of human activities which transform the landscape and how to study mutual relations between these elements. In school, the knowledge thus obtained should be synthesized on the basis of what has been observed.

LR

GUREVICH, A.A.

Rabota uchitelya nad metodicheskoy temoy. (A teacher´s work on a methodological subject).
Biologiya v shkole, 53, 1979, No.1, pp. 44-46.

One of the most important activities of a teacher is further self-education, which also includes working on a specific methodological problem. This work can be divided into several stages. The first stage concerns the choice of a topic (which is connected with the experiences and interests of the teacher, with his education, etc.) for instance a problem approach to teaching. The second stage concerns the reading of literature concerned with this problem. The third stage concerns the definition of basic tasks and methods of dealing with them. The fourth stage includes the practical verification of the chosen method in experimental and control classes. In the final stage a research report is written.

FH

12.2.1 Preparations for botany teaching

ADAMS, P.A.
Simplifying Mitosis and Meiosis
The American Biology Teacher, 40, 1978, No. 1, pp.45-46, 1 fig., lit. 1

The article deals with teaching meiosis and mitosis - two basic biological concepts. In spite of the fact that a great deal of attention is devoted to both concepts, students nevertheless have difficulties in distinguishing what seem to be similar development stages and their large numbers of similar terms. The author suggests a simplified method of explaining both types of cellular division. In contrast to traditional explanations, he uses a more descriptive terminology, which does not divert the attention of the student from the phenomenon itself. Also only the most fundamental aspects of the process are described and the genetic differences between meiosis and mitosis are stressed.

RA

HORN, F.
Methodische Hilfen zur Stoffeinheit "Entwicklung der Samenpflanze" Klasse 5 (Methodological instructions concerning the topic "The development of the higher plants", taught in the 5th class.
Biologie in der Schule, 28, 1979, No.2-3, pp. 66-89. 6 figs.

The draft of methodological instructions in two parts - the first concerns interpretations, which include aims, basic knowledge, relation to other topics and system used in teaching, while the second concerns the process of teaching, and includes the aim of a lesson, teaching media and the course of the lesson. The instruction is the result of cooperation between experts in methodology and teachers. The author in the article analyses both parts of the instruction. Special attention is devoted to the second, process part, in which the subject matter quoted in the title is divided into 9 teaching hours. For each lesson its aim, subject-matter, course of the lesson, media used and general instructions are provided.

FH

IVCHENKO, T. V. et al.
Izucheniye azotnogo pitaniya rasteniy. (A study of the nitrogen requirements of plants).
Biologiya v shkole, 53, 1979, No.1, pp. 47-50, 1 fig., 1 tab.

In the elective teaching subject "Plant physiology" there are 6 lessons devoted to the use that plants make of nitrogen - i.e. three two-hour excercise periods. For every two-hour period the author defines the aim and purpose of the excercise, as well as its methodology and media used and also methods for the formulation of findings. The following assignments are described:

1. The micro-organisms which participate in the fixation of aerial nitrogen and the mobilization of soil nitrogen.
2. Nitrogen fertilizers and the importance of the leguminosae (or pea family) for plants in crop planning and the circulation of nitrogen in nature.

FH

KASSMER, J. - WÖLPER, U. - BONATZ, H.H.
Beobachtungen beim Keimen und Wachsen in versichiedenen Bodenproben. Eine Einführung in ökologisches Beziehungsdenken in einer 5. Realschulklasse. (Observations concerning germination and growth in various samples of soil. An introduction to ecological relationship theory in the 5th class of technical secondary school.)
Naturwissenschaften im Unterricht-Biologie, 27. 1979, No.5, pp. 145-149, 2 figs.

In the topic "The germination and growth of plants" (a unit of 4 lessons), the group of authors recommends the use of beans, wheat and young beech trees, which grow in various samples of soil, with various holding capacities for water. The aim of the project is to learn about the organs of a germinating plant, their structure and function, to learn about various types of soil and other factors of the external environment (moisture, holding capacity, light), to learn how these factors influence growth in plants, to understand the importance of enriching soils with humus, especially sandy soil and the importance of water in the cultivation of plants. During the project, the pupils learn to care for plants, to use various garden tools, to careful by measure and keep records, to carry out observations, to think critically to express themselves both orally and in writing, to draw what they observed and to learn to explain the outcome of an experiment. Also learning to work with others is important. The authors have divided the subject-matter of this topic into four teaching lessons. In class, the main stress is on the ecological relation between an organism and its environment.

AA

OLIVRY, C. - LAROCHE, J.

La prête, Equisetun arvense L. materiel préconisé pour l´étude d´une Ptéridophyte. (The Horsetail /Equisetum arvense L/ - material recommended for the study of pteridophyta).

Biologie, Géologie, 66, 1979, No. 3, pp. 423-432, 3 figs.

The purpose of the article is to show how we can follow the development of spores, gametophytes and the final development of sexual organs. At the same time pupils in various classes have suitable objects for observation. The plan includes the cultivation of easily obtainable material and an analysis of its utilization. Tables summarize the process and also a diagram illustrates it. The very simple nature of this experiment represents a valuable didactical contribution.

LR

PAPAJ, J.

Kliwia na lekcjach botaniki w klasie VI. (Amaryllis /Clivia minata/ in botany lessons in the 6th class).

Biologia w szkole, 32, 1979, No.2, pp. 74-75, 8 figs, 1 tab.

For projects in plant anatomy in the 6th class the author recommends using the plant Amaryllis in place of the Kidney beans usually used, because at the time when plant anatomy is taught (January and February) beans do no do well. A chance event was the cause of this replacement: the pupils accidentaly threw the flower pot with the Amaryllis to the floor and when they were re-potting it they were observing its root system and the surface of the plant. The author provides a detailed description of the plant and points to the fact that its seeds soon lose their germinating capacity and therefore have to be placed into sand for four to five weeks. Amaryllis often have Pseudococcus cytri worms as parasites. During lessons the author made use of the Amaryllis for observations of the internal structure of the roots - observed in a vertical cut and cross-section, the inner structure of the stem (for this purpose also beans were used) and the structure of the leaves under a microscope. The pupils were able to propagate the Amaryllis in a vegetative manner. The germinating pollen was observed, as well as the pollen tube and the detailed structure of the bloom and how the fruit develops. A problem approach was used in teaching.

AA

PFEIL, J.
Ackerschachtelhalm: Unkraut - Reinigungs-und Heilmittel.
(The Horsetail - a weed, cleaning medium and medicinal plant).
Naturwissenschaften im Unterricht. Zeitschrift für die Unterrichtspraxis der Sekundarstufe I - Biologie, 27, 1979, No. 2, p. 49.

The Horsetail is a difficult weed, its shoots are up to one meter long, so that it is practically impossible to wee it out. It grows especially well in wet acidic soil. Its green parts are rough and hard. Its tissue contains a small amount of dissolved $Si/OH/_4$ and a large amount of undissolved H_2SiO_3. In earlier times it used to be used for the cleaning of tin or pewter dishes. The author suggest buying Horsetail in a pharmacy and trying to clean tin vessels with it; when the Horsetail is annealed on a piece of sheet metal and the remainder is added to some HCl, the following reaction will take place: $6\ K_2SiO_3 + 12\ HCl \text{ --- } 4\ KClO_3 = 6H_2O + 8\ KCl + 6\ Si$. Dried Horsetail can be used for meaking a tea which has medicinal properties and is used as a urinal provoking medium, for healing ear affusions and as a bath for various foot inflammations. A sitting bath in diluted Horsetail tea is good for the prevention of a swollen prostate gland.

AA

POHLHEIM, E. - POHLHEIM, F.

Zur Entwicklung des Busch-Windröschens. (Concerning the development of the anemone /Anemone nemorosa/). Biologie in der Schule, 28, 1979, No.4, pp. 145-147.

In the biology text book for the 5th class there is a description of the anemone as an example of the development of a hardy plant. However, the picture does not show correctly the development of the rhizome, which may lead to incorrect notions on the part of pupils. The anemone has an underground rhizom which grows in a horizontal direction (plagiotropically). In the spring a rhizome grows out of the final bud in a perpendicular direction (orthotropically) and has three leaves before the terminal flower. The rhizome of the anemone is a monochasium. In conclusion, the author shows on a picture various stages of development of the anemone and recommends various assignments for pupils.

FH

RAHAM, R.G.
Exploiting the Lichen Liaison
The American Biology Teacher, 40, 1978, No.8, p. 470-479.
12 figs.

The article deals with the opportunities which lichens provide for school teaching. In a general introduction there is a brief characteristic of lichens, their reproduction and the problems of the association of fungi and algae in lichens. Also various suggestions for laboratory excercises using lichens are provided and various aspects of collecting them, identifying them and observing them under the microscope are discussed. Special attention is devoted to an analysis of the lichen plant body, of the chemical composition of lichens and various activities connected with these aspects. Three methods of isolating the algae, by forming conditions in which the algae overgrows the fungus or by sterilization are described. The part of the article which deals with the chemical properties of lichens concentrates on acids, some of which are specific only for these plants. Their structure, properties and function are described. Also how to proced in colour tests and tests for crystal formation are described. The former is used as a rough classification of lichens, according to their chemical differences. However, specific identification depens of the latter test. Among the other suggestions for assignments there is a test for the effectiveness of the antibiotic qualities of lichens in a polarized light and the reaction of lichens to specific substances.

RA

RASHKOVA, S.

Temata "Usloviya za protichane na fotosintezata" v X.klas. (The topic "Conditions of photosynthesis" in the 10th class).

Biologiya i khimiya, 22, 1979, No.1, pp. 28-35. 6 figs., 2 graphy.

The main method of teaching this topic is a discussion, together with explanations, and the independent work of pupils. First, the pupils recieve the task of recalling what they know about the structure of the leaf from the botany course taught in the 6th class and to answer questions concerning the physical and chemical processes which take place in the course of photosynthesis. Only after the teacher determines what the pupils know about this process can he ask further questions, such as: what are the necessary conditions for photosynthesis to take place? With the help of an overhead projector, the pupils become acquainted with the structure of chloroplasts and how they develop. The pupils are finally able to compile the necessary conditions for photosynthesis to take place: a concentration of CO_2, light radiation within a specific wave length range and the freeing and utilisation of substances rich in energy.

In conclusion of the discussion the pupils learn about conditions and possibilities for influencing these conditions and thus also the intensity of the photosynthesis process and the assimilation of the plant product.

LR

SEREBRYAKOVA, T.I. et al.

Povishit nauchniy uroven kursa botaniky. (Improving the scientific quality of the botany course).

Biologiya v shkole, 53, 1979, No.1, pp. 32-36.

The draft of a new botany syllabus has a number of positive characteristics, but it does not incorporate any radical changes. One new element it should, but does not include, is a system approach to teaching. The authors cite a number of recommendations for improving the new syllabus. Their greatest attention is paid to the topics "The Leaf" and "The Stem", which both need a change of structure, because the relation between the whole and the partial is not dealt with correctly. Also the topic "The plant as an integrated organism" has a number of errors in it.

FH

SCHOLZ, E.-F.

Möglichkeiten der Darstellung und Erarbeitung der Vegetation und der Tierwelt des Alpenraumes im Biologieunterricht der Sekundarstufe I ab 7. Schuljahr.

(Opportunities for demonstrating and studying the flora and fauna of the Alpine area in biology teaching in the 7th class of secondary school).

Naturwissenschaften im Unterricht - Biologie, 27, 1979, No. 10, pp. 297-305, 3 figs.

For the pupils and teachers of schools in the vicinity of the Alps it is important to become acquainted with the flora and fauna of the area. However, the biology syllabus does not include such problems. The Alps are an area of extreme conditions for life and ecological factors with large-scale intervention by man. Many pupils spend their vacations in the Alps and are able to see for themselves the negative effects of human activity. The mindless collection of plants for herbariums and digging up Alpine plants to take home by turists has done great damage. The Alps have various vegetation belts which include the zone of cultivated plants, deciduous forests, coniferous forests, the belt of stunted growth, Alpine meadows, a zone of carpet forming plants, algae and lichens and finally the area of eternal snow and ice.

Each plant species is bound to a specific zone. The specie composition of plants is influenced by various ecological factors: among organogenic factors are the presence of insects for pollination, host plants for fungi, substrates as providers of nutrition, historical factors, factors of competition. Alpine fauna is also bound to individual zones of plants. In the winter, the animals migrate to lower altitudes, change their colours and there is widespread melanism (black colouring). Alpine fauna is adapted to a brief period of reproduction (for instance viviparity). The author provides an outline of the conditions of life in the Alps and the way of life of Alpine animals, as well as the consequences of the intervention of man into this area, in a manner suitable for school teaching. The biology course should especially stress the prevention of negative consequences due to the presents of people in the Alps.

AA

SCHWARZ, E.
Gartenkresse im Unterricht. (Garden cress in school teaching).
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No. 9, pp. 276-281, 2 figs., 2 tabs.

Garden cress (Lepidium sativum) of the Brassicaceae family is a very good object for biology teaching. On the basis of simple experiments it can serve for teaching topics on germination, plant ecology, the propagation of plants, for explaining the term habitat niche, for experiments with germination in various temperatures and light conditions, etc. The garden cress is a cultivated plant with little practical importance. It is easily obtainable and an excellent medium for teaching. It is available every year, because the seeds maintain their germination ability for a long time. In six years their germination capacity declines only by one fifth. Also changes or decreases in temperature in which the seeds are stocked do not harm them (from -22° C to +45° C). The seeds germinate in the dark, as well as in light. The seed coat has a swelling capacity which is very large - in one minute, the seed is 50 % larger. Temperatures below 10° C and above 25° C slow down germination. For experiments in plant physiology it is best to use 4 to 8 day old seedlings. They are suitable for experiments in which they are etiolated, which the author describes in detail.

AA

SCHWARZ-KIRN, B. - SCHNEIDER, V.
Zur Behandlung der Bakterien im Biologieunterricht der Sekundarstufe I. (On teaching about bacteria in the secondary school biology course).
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No. 3, pp. 80-95. 5 figs. 10 worksheets.

The authors here submit the didactical development of the topic Bacteria, as taught in secondary schools. The main focus is upon both the advantages provided by bacteria and the damage to health they cause, as well as problems of health care, hygiene and the learning of experimental skills in techniques concerning bacteria. The pupils should know that bacteria not only are the cause of disease, but also are important as objects for understanding the importance of micro-organisms for the life of man, for the food industry, for regulation processes taking place in nature and in artificial eco-systems (for instance the cleaning of polluted water). Today bacteria are also an important factor in industrial output and in the processing of food. The authors also discuss the history of how bacteria were discovered.

Among recent developments the authors describe the importance and use of bacteria for obtaining proteins from crude oil. Once cow (500 kg. weight) produces half a kilo of proteins daily, the cultivation of soya beans (500 kilos), produces 50 kilos of protein daily, while 500 kg of bacteria will produce 50 000 kilos of proteins daily. Various techniques of cultivating bacteria in schools are described, their cultivation in an artificial medium, their staining, the making of microscopical specimens, etc. The authors also provide information about an excursion to a dairy plant, where the pupils become acquainted with how the growth of bacteria can be prevented and about bacteria and infectious disease. The whole article is a very fine contribution to the didactical development of this interesting topic.

AA

12.2.2 Preparations for zoology teaching

ALTMANN, A.
Hlodavé zuby zajícovitých a hlodavců. (The incisors of leporidae and rodents).
Přírodní vědy ve škole, 30, 1978/79, No.2, p. 54.

The incisors of the leporidae and rodents are covered with dental enamel only in the front. The back part of these teath are covered with a much thinner dentine. By using the incisors, the back part of these teeth wears out much more rapidly than the front of the teeth, which causes the forming of a sharp rounded edge. The leporidae and rodents sharpen their teeth by rubbing them against other teeth; the lower jaw slides back and forth, while at the same time also making intensive movements from side to side. This takes place not only during feeding, but also in sleep. This grinding of the teeth is made possible also by a free jaw joint.

VČ

ALTMANN, A.

Plazi - K tematickému celku Plazi v experimentální učebnici Zoologie 6. (Reptiles. Concerning the thematic unic "Reptiles" in the experimental zoology textbook for the 6th class).
Přírodní vědy ve škole, 30, 1978/79, No.5, pp. 167-169.
15 photos, 1 tab., 1 diagram.

The article is a model methodological manual for the teacher using the experimental zoology textbook for the 6th class, which was published in Prague by SNP in 1978.

The thematic unit "Reptiles" in the new teaching syllabus has 4 teaching lessons devoted to it. The topic of the 1st lesson includes the sand lizard, the 2nd lesson is devoted to the grass snake and viper snake, the 3rd lesson to foreign reptiles and the 4th lesson to the development of reptiles and their life in prehistorical times. All four lessons are developed in the article in relation to the educational aims, methods, media, teaching forms used, etc. New terms and notions are listed and the course of each lesson, including writing on the blackboard, are described in detail.

VČ

ALTMANN, A.
Ptáci rybníků. (Birds found on fishponds).
Přírodní vědy ve škole, 30, 1978/79, No. 2, pp. 49-50.
17 photos.

The article describes a model lesson on this topic in the 6th class of basic school. The subject-matter is orientated in an ecological manner and essentially deals only with representatives of the Lamellirostres, in view of the regional principle. Before the topic is taught, the author recommends organising an excursion to a non-frozen water surface in the winter.

VČ

ANGELOVA, R.B. - ATANASOVA, A.K.
Metodicheska razrabotka ma urotsi po formirane na filogenetichni ponatiya pri izuchavane na gribnachnite zhivotni. (The methodological development of the task of forming phylogenetic notions in the topics concerning vertebrates).
Biologiya i khimiya, 22, 1979, No.2, pp. 15-21.

Learning phylogenetic terms and notions contributes to the forming of a correct world outlook. This requires that the topic be well prepared and methodological by analysed, so as to adjust the aims of individual lessons to this general aim. The authors developed the following individual lessons, from the point of view of phylogeny:

1. Cartilaginous fish.
2. The order of Candata of the class Amphibia.
3. The origins of reptiles.
4. The internal structure of the domestic pigeon.
5. The lower and higher mammals.
6. The evolution of the species.

Individual lessons are linked together in such a way that pupils already after the first lesson come to realize the characteristic evolutionary changes which have taken place in the development of the animals studied and that they learn to derive from the structure of a an animal´s body, its progressive traits.

LR

BITTNER, C.

Die Ermittlung von Schülerinteressen zu dem vorgegebenen Rahmenthema "Vögel". (Mediating pupils´ interests within the framework of a given topic - "Birds"). Naturwissenschaften im Unterricht-Biologie, 27, 1979, No.8, pp. 233-240, 1 worksheet.

The author carried out a situational analysis within the framework of a given topic - "Birds" - in order to increase the pupils´ interest in biology. Pupils received a total of twenty questions, of which they were able to chose five. On the basis of this selection the teacher was able to draw conclusions about pupils´ interests, and thus to chose topics for teaching which will interest pupils. The selection reflected the pupil´s situation and environment, as well as the needs of society. In the author´s opinion, biology should teach topics which are related to present and future situations of pupils. 12-year-old pupils in the 6th class - in the course of a research project on this subject - have indicated that they are interested in biology. Each pupils was asked to write next to the topic "Birds" five questions which were of interest to him. The outcome was a total of 215 questions, which in fact were 153 different questions. The worksheet cited in the article contains 12 questions drawn up on the basis of this project. Pupils were asked to indicate on a scale of 1 - 5 to what extent each question interests them. This is an interesting pedagogical method a could perhaps be used also for other topics.

AA

BRAUNER, K.

Steckmücken entwickeln sich im Wasser. Eine Unterrichtseinheit für das 7. - 8. Schuljahr. (Mosquitoes develop in water. A teaching project in the 7th and 8th classes). Naturwissenschaften im Unterricht, 27, 1979, No.5, pp. 129-138, 2 worksheets, 8 figs.

The mosquito (Culex pipiens) is an object which is suitable for studying the development of insects and the problems of combating insect pests. For this it is necessary to know about the biology and especially the reproduction and development of insects. Teaching should be based on a study of original objects and their observation (egg, larva, pupa, imago, photographs, drawings, newspaper clippings for motivation). The author describes the development of the mosquito, interesting observations concerning the larva and pupa (the shade reflex), various methods of respiration of the larva and pupa. The mosquitoe's territorial incidence, the development of four to six generations annualy, the localities in which mosquitoes develop. Blood is sucked only by the females, who need the blood of warm blooded animals for the development of eggs. The author also discusses chemical substance for combating mosquitoes and various interventions into the environment which make it possible to dry out stagnant waters and thus prevent the development of mosquitoes.

AA

HÜNGSBERG-SENZ, U.
Formänderung and Pflanzen - Gallbildung - aufgezeigt am Beispiel der Eichen - und Rosengalle. Unterrichtsentwurf für das 6. Schuljahr. (Changes in the shape of plants - the forming of galls - demonstrated on the example of gall on oaks and roses. Suggestions for teaching in the 6th class).
Naturwissenschaften im Unterricht, 27, 1979, No.10, pp. 306-312, 2 figs, 1 worksheet.

The formation of plant galls is a subject which is only marginal in the biology syllabus and is usually left out completely. Nevertheless, pupils in the majority of cases know about the formation of galls, but they are unable to explain them. This can provide the motivation to learn more about plant galls in the 5th or 6th classes. The study can be done on the basis of simple media and makes it possible for pupils to become acquainted with biological problems on the basis of practical work with an original object. In class, pupils can work with plant galls brought in from the outdoors, become acquianted with gall midges and gall wasps. On the basis of these observations they can complete the worksheet attached to the article.

AA

DYLLA, K., KATTMANN, U.
Art oder Rasse? Eine Übung zur systematischen Einordnung von Populationen einheimischen Singvögel (Geschwisterarten und Geografische Rassen). (Specie or geographical variety? An excercise in the systematic classification of native birds - related species or geographical varieties?)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No.2, pp. 29-45. 7 infor. sheets, 1 model for transparency.

The authors discuss the terms specie and geographical variety. Animal populations are groups of individuals of a single specie, which are clearly isolated from other groups (however, total isolation is not necessary) and therefore they form a reproductive community. Individual populations are not equal, they may differ genetically. Varieties are populations of a single specie, which differ in the distribution frequency of their genes. The term geographical variety thus does not pertain to the genotype of an individual, but to the state of genes of a population. The whole problem is illustrated on the basis of examples based on maps of distribution, which make it possible for the pupils themselves to solve the problem on the basis of information given to them. For instance the Carrion crow and Hooded crow are geographical varieties, which both belong to the specie the common crow (Corvus corvus). Between the area of both varieties there is a belt about 30 km wide where both varieties mix. The Greayheaded woodpecker and the Green woodpecker are, however, two·independent species and their geographical areas opverlap. Those populations, which do not cross-breed, and whose territories overlap, are species. The author also deals with the geographical separation of populations and with the consequences of this phenomenon: when separations are overcome, populations tend to mix where territories meet: when these populations remain genetically distinct and their territories merely overlap, we are dealing with separate species. The information sheets attached to the article provide assignments for pupils on other species and varieties of European birds.

AA

LIESENFELD, F.-J.
Ein methodischer Vorschlag zum Unterricht über Vogelstimmen in Klasse 6. (Methodological instructions on teaching about bird voices in the 6th class).
Biologieunterricht, 15, 1979, No. 1, pp. 48-56, 5 figs.

One of the subjects of research in modern ethology are the acoustic expressions of animals, especially birds. In birds we must distinguish singing for the purpose of marking a territory, singing to lure, to warn and sounds which reflect the state of the bird. The sounds produced by birds can be recorded on a tape recorder and also records with the singing of birds are available. The author teaches the topic of bird voices in a total of 12 lessons which he describes in detail. He uses a number of various media such as tape recordings, phonograph records, optical recordings of sound (a spectrogram), playing the recordings at normal and slower speeds and their graphical representation by pupils on the basis of stuffed animals and drawings. Basic sound analysis is done on the example of the Blackbird and the Chaffinch, that is on birds which live on the same territory and which are not food competitors. Pupils also participate in observations outdoors, where they also make maps of the territories occupied by various birds of the same specie and the division of a territory between two different species of birds. In each lesson the author deals with the voice of one bird and also acquaints pupils with the biology and exterior of the bird. Also an analysis of an individual recording is undertaken: the notes which the bird sings are taken down and varieties of song are studied, for instance of the Cukoo. After the completion of the whole project, the author verified the knowledge the pupils had gained with a suitable test, which was partially based on playing bird recordings. Attached to the article is a list of bird recordings available in the Federal Republic.

AA

PFANNSTIEL, G.

Die Knorpelplatte im Oberkiefer des Rindes. Ein Gegenstand des Anfangsunterrichtes im Fach Biologie.
(The cartilaginous plate found in the upper jaws of cattle. A suitable object for the initial teaching of biology).
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No.7, pp. 223-224, 1 fig.

Within the framework of the topic "Animal nutrition", usually domestic cattle are studied as an example of ruminants. Besides specific aspects of dentition, dental formulas are often the subject of class work. When the dentition of cattle and its structure and function is being discussed, the structure and function of the cartilaginous plate in the upper jaw of cattle is also touched upon. The author suggest obtaining, mounting and preserving such plates in the general education secondary school biology course. This plate functions in the place of incisors, which are lacking in the upper jaw. When grazing, the grass is pressed by the lower incisors and canine teeth (which have the shape of incisors) to the cartilaginous plate and by jerking, the grass is cut. By continous grazing this plate is worn out and therefore grows again, throughout the life of the cattle. In calves it is still relatively thin and soft, while in adult cattle it is hard and strong.

RADEMACHER, M.

Winterstarre als Überwinterungsform bei Fischen. Eine Unterrichtstunde im 5. Schuljahr der Orientierungsstufe (Winter ridgidity as a form of surviving the winter by fish. A teaching lesson in the 5th class of basic school).

Naturwissenschaften im Unterricht, Zeitschrift für die Unterrichtspraxis Sekundarstufe I, 27, 1979, No. 2, pp.38-44, 1 fig., 1 model for transparency, 1 tab.

Within the framework of the topic "How animals survive the winter" one teaching lesson can be devoted to "Winter ridgidity as a form of surviving the winter by fish". In class the pupils become acquainted not only with new knowledge on how fish survive the winter, but also deal with the problem of the influence of temperature on animals. At the same time experiments also serve to teach skills in biological methods. On the basis of experiments and observations the author describes the behaviour of goldfish in water of various temperatures - from normal to temperatures at which winter hibernation takes place. The movement of the fish slows down, the frequency of breathing movements declines, the fish sinks to the bottom of the tank and becomes ridgid. Winter hibernation should be distinguished from winter sleep and winter rest of animals. The author describes an experiment in which 9 goldfish are used in nine glass vessels which have river sand at the bottom. Also nine thermometers are needed and eight glasses with ice cubes, a watch with a seconds hand, three to four stop watches, chalk, a blackboard and an overhead projector. The temperature of the water is measured, the water is cooled by the ice cubes, the breathing movements of the fish are counted per minute - at normal room temperature, at + 8°C, at 6°C and also at other temperatures. The measured values are written into tables.

350 AA

SCHAAF, R.

Tierdressur auf der Grundlage des nachgeborenen Verhaltens. Eine Unterrichtsstunde im 6.Schuljahr
(The training of animals on the basis of their inborn behaviour. A teaching lesson in the 6th class)
Naturwissenschaften im Unterricht-Biologie, 27, 1979, No.12, pp.353-359. 1 fig. 1 model for transparency, 1 worksheet.

Topics concerning animals and their inborn behaviour have only recently become part of the biology teaching syllabus. Such topics enable pupils to achieve an understanding of important biological knowledge, which can then be practically utilized in the breeding of animals. Inborn behaviour and animal training should be considered separately. Topics for learning include the training of pets and animals in circuses and zoological gardens. Inborn behaviour takes its course automatically and is specie specific. Training in effect utilizes an individual approach to various influneces existing in the environment. The author describes the inborn behaviour of the snake grass and the viper snake when hunting, animal training is shown on the example of the domestic rabbit - which provides an opportunity for group work with an original objects.

AA

TREITZ, P.

Mit den Schnaken leben lernen. Fachübergreifendes Unterrichtsmodell für das 7. - 9. Schuljahr (2. Teil)

(How to learn to live with mosquitoes. An interdisciplinary teaching model for the 7th - 9th classes. Part II.)

Naturwissenschaften im Unterricht-Biologie, 27, 1979, No. 9, pp. 270-275, 2 figs., 11 tab., 2 worksheets.

The author discusses a situation in which it is possible to combat mosquitoes in an optimum manner with fish. Usually fish can be found in shallow water only after floods or high water marks. And shallow, drying out waters are the best hatchery for mosquitoes. In the 5th and 6th lessen the author recommends teaching the problem of how swallows and martins can use artificial nests, which pupils can make according to the attached blueprint and with the help of a teacher. Essentially these are only the foundations for the building of nests by the birds themselves. In the 7th and 8th class administrative and individual measures to combat mosquitoes are discussed.

In the Rhineland the are a number of opportunities for combating mosquitoes on the basis of the knowledge gained in various natural sciences and by the implementation of interdisciplinary relations. The author provides detailed descriptions of two of the most common species of mosquitoes. The author describes methods based on the use of fish and insectivourous birds. The worksheets for this part of the topic deal with administrative and individual measures taken against mosquitoes. Physical methods are used in the form of acustical instruments, those using light and a lipid film on the surface of the water, chemical methods are based on the use of biocids, larvacides and insecticides. Also eco-technical measures in the form of drainage and land reclamation, as well as the stabilization of water levels, etc. are discussed. The physical measures described include the use of nets, acustical instruments and a source of light combined with a trap. Among the chemical measures used are fume producing candles and sprays, while bio-chemical measures include the use of hormones, growth regulators, the biological propagation of the mosquitoes' natural enemies and genetic methods of combat.

AA

WERNER, E.

Brutverhalten der Sandwespe (The behaviour of the insect Ammophila sabulosa when laying eggs)
Naturwissenschaften im Unterricht-Biologie, 27, 1979, No.10, pp.312-315. 2 worksheets.

The behaviour of most animals cannot be demonstrated in class on the basis of an original object. For studiyng the insect Ammophila sabulosa the author suggests the use of a worksheet which is provided and which makes it possible to demonstrate the complex behaviour of the above mentioned insect when laying eggs. Essentially the problem is the care of the insects' progeny (providing food for the larva which hatch from the eggs). The pupils see that the insect behaves in accord with a specific pattern.

AA

WOLF, K.

Der Winterschlaf - dargestellt am Beispiel des Igels. - Eine Unterrichtsstunde für das 5. bzw. 6. Schuljahr
(Winter hibernation - on the basis of the example of the hedgehog. A teaching lesson for the 5th or 6th class)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No. 10, pp. 289-295. 2 worksheets, 1 model transparency.

The adaptation of animals to winter hibernation can be demonstrated on the basis of the example of the hedgehog. The aim of the lesson is to provide information on how the hedgehog manages to survive the winter. On the basis of observations in nature the problem is formulated, hypotheses are formulated; on the basis of a number of pictures of a hibernating hedgehog the pupils are asked to solve the problem verbally and on the basis of a worksheet. For this purpose also a transparency is used, which shows the behaviour of the hedgehog during the winter, its respiration and heart activity. During this lesson it is necessary to distinguish two basic terms - winter sleep (hibernation) and winter rest or winter ridgidity of animals. During winter rest, respiration and heart activity remain normal and the animals's rest is interrupted by shorter or longer periods of activity (the squirrel and the badger). Winter ridgidity is more like death - various vital functions are almost non-existant (reptiles, amphibians, insects).

AA

12.2.3 Preparations for human biology teaching

BLINOWSKAJA, J. W. - RUBATSCHEWA, L. I.
Methodische Gestalgung der Thematik "Biosphäre und Mensch" (Methodological comments of the topic "The Bio-sphere and Man")
Biologie in der Schule, 28, 1979, No. 7/8, pp.289-298.

The one but last topic taught in the 10th class is the topic "Cells, organisms, populations, bio-cenosis, bio-sphere", which receives very little attention in the existing methodological instructions. For this reason the editors of the journal decided to translate this article from the Soviet journal Biologiya v shkole, which discusses how this topic is taught in the USSR. The subject is divided into five teaching lessons, and for each lesson the aim, means and methodology of the lesson are cited, including the methodology used for verifying pupils' knowledge. Individual lessons concentrate on the following problems: The bio-sphere and bio-mass, the circulation of energy and matter in the bio-sphere, the bio-sphere as the outcome of the evolution of organisms, the role of man in the bio-sphere, biology and human activity.

FH

DOERING, D. - OLSCHEWSKI, G.

Die Erregungsleitung - Ein Unterrichtsmodell für die Sekundarstufe 1. (The transmission of excitation - a teaching model for the lower classes of secondary school)

Naturwissenschaften im Unterricht - Biologie, 27, 1979, No. 11, pp. 333-344. 2 programs, 2 worksheets, 4 figs.

The authors describe a model teaching lesson on the subject of the transmission of excitation, which concerns a number of phenomena from molecular biology, and which become more comprehensible.

AA

DUHR, B.

Rassen- und Artbildung als populationsbiologische Prozesse. Unterrichtsmodell Sekundarstufe II. (The development of species and breeds as population biological processes. A teaching model for the upper classes of secondary school)

Biologieunterricht, 15, 1979, No. 2, pp. 5-33, 8 figs., 3 tabs.

The author provides information on opportunities for teaching topics concerning the development of breeds and species, for a period 8 to 10 teaching lessons. Causal factors in evolution change or stabilize the composition of a population, which belongs to a single specie in the sense of bio-specie. This influences the forming of new species and new trends in the development of the phylum. The teaching of this topic in the upper classes of secondary school is based on the pupils' knowledge in genetics, molecular biology, ecology, systematics, morphology and physiology. It also makes use of relations between various teaching subjects, such as bio-chemistry and bio-physics, geography, history, etc. The author defines races and species, describes changes in the population and recommends various practical studies which can be carried out outdoors and in school: for this purpose a study of molluscs (Cepea nemoralis), which can be collected in various biotopes are recommended, as well as a study of aquarium fish (Platypoecilus, Xiphophorus maculatus and Xiphophorus helleri). Some sections of the topic concern plant populations and animal populations in the Ice Age on glacial refuges which were also populated by man and which contributed to the forming of human races, which in the author's opinion are geographically isolated populations characteristics of alleles. Of interest are also the maps of movements of human races on the Euro-asian continent after the Ice Age.

AA

HILLEN, W.
Unterrichtsbeispiel zum Thema "Ernährung" für die Klassenstufe 5 (A teaching model for the topic "Nutrition" for the 5th class)
Naturwissenschaften im Unterricht-Biologie, 27, 1979, No. 4, pp. 117-122. 1 worksheet.

Human biology which has always predominated in the biology syllabus for the upper classes, has now due to various changes been transfered to lower classes, for instance the 5th and 6th classes. This can, however, be done on the basis of a didactical reduction of the syllabus. Hand in hand with this reduction also methods and media should be changed. It is in this context that the author discusses the demanging topic of "Nutrition" and demonstrates how it can be successfully taught in the 5th class.

AA

KAISER, H.
Zu Grundaspekten der Problematik:Der Mensch als biologisch-gesellschaftliches Wesen (On the basic aspects of the problem of man as a biological and social being)
Biologie in der Schule, 28, 1979, No. 11, pp. 449-454.

Discussions concerning the essence of man and his status are still continuing and include a number of gnoseological and philosophical problems. Man is characterized as a biological and social being. However, it is necessary to distinguish social in the sense of structure, which also exist among animals, and societal in the human sense. The author prefers the term "biotic", rather than "biological", which he explains in a historical and world outlook context, as well as from the point of view of ideology and philosophy.

PH

KIRSCHSHOFER, R.
Stammesgeschichte der Primaten - Zoo-Lehrweg zur Abstammungslehre (The development of the primate phylum - an excursion to the Zoo Learning Trail to study evolution)
Biologieunterricht, 15, 1979, No. 3, pp. 60-105, 19 figs.

The author explains why he chose the topic on the development of the primate phylum for teaching in secondary school. The school departments of zoological gardens offer a Learning Trail, which in a suitable manner supplements the topic "The Origins of Man". Connecting this subject with the broader topic of the phylogeny of primates in general makes it possible to better understand the whole phyologeny of man. The author introduces all modern scientific findings of the last fifteen years concerning the phylogeny of primates. He first discusses the history of the problem (Aristoteles, Linné, Lamarck, Darwin, Huxley, Haeckl), as well as the opportunities which modern science provides and the methods it uses (the study of fossils, comparisons with extant forms, radioactive methods of dating with C_{14}, the K-A method, the findings of morphology, physiology, ethology and phylogeny). Also some of the problems of determining the lower boundry of primates are discussed - the transition to insectovores and the problem of living fossils, such as the tree shrew (Tupaia glis). In conclusion the author provides a modern summary of primates and points out how this knowledge can be used in biology teaching in school.

AA

LETHMATE, J.

Zur Bedeutung der Primatenethologie im Rahmen des Biologieunterrichts (Concerning the significance of the ethology of primates within the framework of biology)

Der Biologieunterricht, 15, 1979, No. 3, pp. 4-59. 16 figs.

The ethology of primates and especially the ethology of man are very suitable topics for teaching in the upper classes of secondary school. The problem has been studied by modern ethology, especially where it deals specifically with primates; when studying the ethology of lower vertebrates, there is a danger in applying its findings to the behaviour of man. A study of the behaviour of man should be based on the ethology of primates, but also on human cultural anthropology. A study the ethologies of monkeys and primates can contribute to understanding a number of human behavioural patterns. In modern times man comes more often into contact with strangers than with members of his own family and makes more contacts through various technical media, while at the same time decreasing the number of personal contacts. Thus man acquires more passive than active experiences and is forced to exert more imposed activity rather than his own, while technical and social changes occur so rapidly that they cannot be transfered to future generations. Man makes more learning contacts with machines than with other humans and has insufficient direct contact with nature. In the article, the author deals in detail with three groups of problems concerning the ethology of man: behaviour in the mother-child relation, intelligent behaviour and its ontological prerequisites and social behaviour, including sexual and aggressive behaviour. These problems are discussed in detail and their use in school teaching is described.

AA

LICHTENSTEIN, F.-M.
Transport der Nahrung in der Speiseröhre. Ein Stundenentwurf für das 6. Schuljahr (Orientierungsstufe)
(The transportation of food through the oesophagus)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No. 12, pp. 360-366. 2 figs.

The article provides a model explanation of the structure and function of the oesophagus within the framework of the topic "The structure and function of the digestive system". A problem teaching approach is used on the basis of such questions as: How is food transported to the stomach ? The pupils also learn about peristalsis. What has been learnt can be summed up by showing a film. Also an experiment with a 25 cm long hose and a wooden ball is described.

AA

MÜNCHAU, V.

Die Behandlung von Emulsionen im Rahmen des Faches Ernährungslehre im Fachgymnasium, sozialwirtschaftlichen Zweig (Dealing with emulsions within the framework of nutrition theory at specialized general education secondary schools - in the social and economic specialization)
Der mathematische und naturwissenschaftliche Unterricht, 32, 1979, No. 5, pp. 289-292.

The author discusses this topic from the point of view of the curriculum at specialized general education secondary schools, and specifically from the point of view of nutrition theory. Included in the article are the chemical and physical aspects of emulsions, as well as the didactical aspects of these teaching subjects. He describes the preparation of food emulsions, mayonnaise, margarine and butter and stresses the nutritional value of these emulsions in nutrition and in man's food.

AA

PFANNSTIEL, G.

Die Erarbeitung der geschlechtsspezifischen Differenzen des Homo-Schädels. - Ein Thema für den Oberstufenunterricht in Biologie (Dealing with sex-specific differences in human skulls. A topic for biology teaching in upper classes)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 11, pp. 292-296, 2 tabs., 8 photos.

In teaching the phylogeny of man in the upper classes of general education secondary school, hominid and pongid characteristics are compared. In this concenction, pupils often ask whether the sex of the individual can be discerned on the basis of a skull, whether differences exist in the facial or cranial parts of the skull. The author suggest devoting three teaching lessons to this topic. He provides a table of differences on the basis of which it is possible, with a high degree of certainty, to determine the skull of a male from that of a female. But for greater certainty it is also necessary to carry out a comparison of the pelvic bone. In that case the liklihood of making a correct estimate is much higher. When only the skull is available, the liklihood of a correct determination is only 78 %.

AA

PFEIL, H.

Muskalkater (Muscle hangover)

Naturwissenschaft im Unterricht. Zeitschrift für die Unterrichtspraxis der Sekundarstufe 1 - Biologie, 27, 1979, No. 2, p. 50.

When overloading of muscles occurs, for instance in sports, atheletes often complain of pain. What they are suffering from is also co-called muscle hangover. The author describes the chemical processes leading to this state. The muscles contract approximately twenty times during a second and require large amounts of oxagen for this activity, as well as substances which are a source of energy (such as glucosis). Glucosis must first be phosphorized by the enzyme hexokinasis. It then undergoes fission through pyruvic acid $C_3H_4O_3$ to lactic acid $C_3H_6O_3$. Venous blood contains more lactic acid than arterial blood.

The cardiac muscle carries out much more work and at the same time uses lactic acid: $C_3H_6O_3 \longrightarrow 3\ CO_2 + 3\ H_2O$. When the muscle is exerted in an increased manner, the necessary energy is obtained by the oxadation of $NADH_2$ from lactate dehydrogenasis. At the same time H is transmitted to pyruvic acid. As soon as lactic acid accumulates in the muscle, we feel tired. The muscles require rest, so that the lactic acid can be transported away. Otherwise the legs begin to hurt. This can be alleviated if we massage the muscles or provide warmth.

AA

REICHL, R.
Verträglichkeit und Unverträglichkeit der Blutgruppen bei Transfusionen. Beispiel einer Unterrichtsstunde in einer 9. Klasse (Compability and incompability of blood groups during blood transfusions. A sample of a teaching lesson in the 9th class)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No. 11, pp. 321-327, 2 workscheets.

Pupils often do not understand the mechanism of blood transfusions. The necessary conditions needed for a transfusion can be shown with the aid of a paper model and in the form of a game. In the game two pupils discuss the theoretical aspects of blood compatibility and find that those with the 0 blood group are not always universal blood donors with no further problems, as textbooks often falsly claim. Colour models can be made of styroporous material and with them immune reactions can be shown. In the 1. blood group (universal donors) it has recently been shown that only those persons are universal donors whose blood group is 0 and Rh+ and whose anti-A and Anti-B bodies are present in dilutions of 1:200, no longer react with the blood cells of blood groups A and B, and whose serum does not manifest hemolysis against A - or B - erythroocytes. However, in transfusions also the Rh factor is of importance, especially in repreated transfusions. In central Europe approximately 40 % of the population have the blood groups A and O, 13 % have B and 7 % have AB. The purpose of teaching this topic is to acquaint pupils with blood groups and to work with a model of blood transfusions.

AA

SCHNEIDER, H. - SCHNEIDER, M.
Die Aufrichtung der Wirbelsäule-Vorschläge zur Behandlung im Unterricht (The process of achieving an upright spine - suggestions for teaching)
Naturwissenschaften im Unterricht - Zeitschrift für die Unterrichtspraxis der Sekundarstufe 1 - Biologie, 27, 1979, No. 1, pp. 1-13, 10 figs., 3 worksheets.

The authors provide suggestions for teaching the subject of an upright spine and its role in the phylogeny of vertebrates. When observing the spine and vertebra from a functional and morphological point of view, it is best to first study the development of vertebra and the spine as an articulated axis and then the process of achieving a vertical position of what was once a horizontal axis of the body, up to the double S-shaped spine in man. The article devotes attention especially to the specific aspects of the human spine. Comparative observations represent the main method of work. The authors suggest dealing with this topic in class on the basis of the problem approach. When teaching this topic, it is necessary to deal with facts in logical relations and to lead pupils to thorough observation and interpretation. Anatomical, functional and evolutionary historical observations are used. For explaining evolution and the process of the vertical development of the spine, work with original objects should be organized, models made and simple experiments carried out. This topic is developed for use in the 6th class; general problems of the body posture of primates are discussed, in the context of life in trees and on the ground, as well as G-shaped spines (chimpanzee), the problem of the movement of the human body when walking, running and standing and problems of the coordination of the extremities in walking. Two worksheets are attached to the article. Also transparencies should be used in class work.

AA

SPERLING, **K.**
Die genetischen Unterschiede zwischen Mensch und Menschaffen (Genetic differences between man and primates)
Biologieunterricht, 15, 1979, No. 3, pp. 106-137.
21 figs.

The author discusses the opportunity to use genetic differences between man and primates as a teaching topic in the upper classes of secondary school. He acquaints the reader with the history of the problem, the outline of development of the phylum and the mutual affinity of all primates. He also provides information on the findings of modern science as far DNA comparisons are concerned (its total quantity is approximately the same - 2.7×10^9 pairs of nuceloids - with a total length of approximately 2 m when unraveled), the outcome of hybridization of DNA-DNA, a comparison and analysis of amino-acid sequences, a comparison of electrophoretical speeds in the movement of homological proteins (bio-chemical methods) a comparison of karyotypes and also an assessment of the significance of regulative mutations in the evolution of man.

AA

STOBINSKY, H.
Aufbau und Funktion der Muskulatur (The structure and function of muscles)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 8, pp. 206-215.
4 figs.

Striped skeletal muscles are the most intensively working biological structure. Teaching the physiology of muscles provides the opportunity to use and strengthen basic knowledge in cytology, metabolism, the function of cellular organnels, bio-chemistry and also to fully implement a linkage between the structure and function of the phenomena under study. Before this topic is taught, pupils should have some knowledge concerning cytology, metabolism, respiration, as well as the physiology of nerve and sensory activity. The topic can be dealt with macroscopically, microscopically and on a molecular level. The structure of the muscle is dealt with in detail and on the basis of theory, observations and experiments. The construction elements in muscles are myosine, aktine, tropomyosine, troponine and actinine. The contraction process of extracted muscle fibres can be observed and a model of the folding movement (contraction) of muscles used. The topic is dealt with in a model manner and is very suitable for the upper classes of secondary school.

AA

SZEJWALLO, Z.
Antropogeneza-konspekt dla kl. VIII. (An outline of anthropogeny for the 8th class)
Biologia w szkole, 32, 1979, No. 2, pp. 81-83.

A film lesson on the anthropogeny of man was shown at the 4th All-Polish Festival of Didactical Films at Lodź. The aim of the film is to extend and strengthen knowledge on the evolution of man, to show evolutionary changes in the human genus, the influence of the environment and of work. The film has three parts; at the beginning of each the problem which is then dealt with in the film is formulated. The first part deals with the difference between monkeys and man, the second deals with the causes of evolution and the third sums up the whole problem. The author of the article discussed ways in which the film can be made use of in the 8th class of basic school and how it should be included into the educational and teaching process. The film proves the relationship between man and the primates and the fact that they have a common ancestor. Man developed on the basis evolution, in the course of millions of years, on the territory of acient Asia and Africa. The main elements in this evolution were work, the development of the hand and the development of the brain. All people are equal, human races developed as the result of adaptations to various conditions in the environment. The lesson thus described is of great educational importance from the point of view of forming a scientific world outlook.

AA

VERBEEK, B.
Das menschliche Auge in seiner optischen Funktion.
(The human eye and its optical function)
Naturwissenschaften im Unterricht - Biologie, 27,
1979, No. 4, pp. 97-106, 8 figs.

To understand the action of the human eye it is necessary to understand not only its detailed structure, but also its function. From this point of view also technical data on the human eye are of didactical importance; they also make it possible to understand the significance and function of sight aids (eyeglasses), to understand the reason for eye defects, short-sightedness, long-sightedness, astigmatism, etc. The article explains the principle of a slot and lens chamber, the refraction of light on the interface of two environments, adaptation to light and darkness, poor eyesight and its correction.

AA

VERBEEK, B.
Das menschliche Auge und das Sehen (The human eye and eyesight)
Naturwissenschaften im Unterricht - Biologie, 27,
1979, No. 6, pp. 177-185, 7 figs.

On the basis of an explanation of the physical essence of sight and the function and structure of the human eye (cf. previous article in issue No. 4), the author continues in his explanation of the morphology and physiology of eyesight. Experiments which the author recommends using in class concern the blind spot in an eye and observations of the eye fundus. Pupils are able to observe their own eyes with the aid of a dark piece of paper with a small hole pierced in the middle with a pin. The paper is then placed directly in front of the eye and the pierced hole is moved in a small circle. After several seconds the pupil can see the surface and structure of his own eye fundus.

AA

ZVEREV, I. D.

Elementy ekologii cheloveka v kurse biologii VIII. klassa (Elements of human ecology in the biology course of the 8th class)

Biologiya v shkole, 53, 1979, No. 3, pp. 35-39.

In recent years much attention has been devoted to human ecology. In the life of human beings the most important role is played by social conditions. The socio-political and economic structure of society have a great impact on the life and health of people. The author makes more specific the basic content of some problems connected with the ecology of man, which can be taught within the framework of the biology course. In the introductory lesson it should be stressed that man forms a part of nature and also the existance of mutual relations between man and nature should be explained (for instance when teaching the structure of the blood circulation system, respiration and digestion). Various examples of adaptation can be cited. Then the human metabolism is described, it should be stressed that work is a condition of human life: data on controlling work conditions can be cited. New approaches should be used when discussing hygiene of the nervous system, because the number of those sick with nervous disorders is increasing as a consequence of changes in the essence of work. Pupils should also hear explanations of why it is necessary to train the organism. In the final lesson we should discuss with pupils general terms such as "nature conservation" and"protecting the health of the population."

PH

12.2.4 Preparations for general biology teaching

BERGER, D.
Einsatzmöglichkeiten für den Aufgabenteil des Biologielehrbuches Klasse 9 am Beispiel der Stoffeinheit "Die Lebewesen in ihrer Umwelt" unter besonderer Beachtung der Festigung (Possibilities for making use of parts of the textbook for the 9th class containing assignments - on the basis of the example of the topic "Organisms in their environment" with epecial stress on strengthening what has been learnt)
Biologie in der Schule, 28, 1979, No. 2/3, pp. 99-101.

The quality of educational work is among others, also manifest in the extent to which pupils are capable of using the knowledge they have gained. For the topic "Organisms in their environment" the syllabus assumes 22 teaching lessons, which to a large extent contain a repetition of what has been learnt and providing a more systematic approach to this knowledge. The assignments are cited on pages 143-144. The author analyses in greater detail the working of the assignments.

PH

GÄRTNER, M.

Erfassung des Kohlendioxid-Gasstoffwechsels und der Transpiration mit Hilfe der Infrarot-Gasenanalyse. (Evidence of the metabolism of a carbon dioxide and transpiration with the aid of infra-red gas analysis) Biologie in der Schule, 28, 1979, No. 5, pp. 185-192. 8 figs.

The biology syllabus for the 9th to 12th classes devotes a great deal of attention to photosynthesis, energy flows and bio-mass output, but insufficient attention is devoted to qualitative links between radiation and the production of bio-mass. The author first analyses the syllabus from the point of view of the opportunities to include quantitative aspects into teaching and concentrates on the problem of measuring CO_2 metabolism and transpiration. Besides classical methods (absorption by baryta water), also new, more precise methods are used. The author analyses in detail the essence of infra-red gas analysis and the possibility of using this method in class. He also cites examples of calculations of these processes in the 9th, 11th and 12th classes.

PH

KALINOVA, G. S. - KOMISARYOV, B. D.

Podgotovka pyatiklassnikov k izucheniyu evolutsii organicheskogo mira. (Preparing 5th class pupils for learning about the evolution of the organic world) Biologiya v shkole, 53, 1979, No. 3, pp. 40-45. 1 tab.

The biology syllabus places great stress on evolution theory, because knowledge in this area is a prerequisite for human activities in a number of areas. But pupils have difficulty in learning various evolutionary terms. One cause of this is the fact that insufficient use is made of the opportunities provided by the syllabus in lower classes. In developing the methodology of teaching evolutionary notions the authors here make use of studies in the logical structure of Darwinism. From an analysis of the botany syllabus it has been found that there are many opportunities for acquainting pupils with the premises of Darwinism (the authors provide a detailed table of when and where). The development of adaptation is explained in the course of two teaching lessons and this methodology is described in detail. In order to further make evolutionary notions more specific, the authors recommend that in each topic, to which two to three teaching lessons are devoted, five to ten minutes of the lesson be devoted to explaining the process of adaptation and such notions as heredity, variability, the intensity of reproduction and natural selection, which the authors document on the basis of specific examples.

PH

KISELEVA, Z. S.
Zadachi po genetike i metodi ikh resheniya (Assignments in genetics and methods for dealing with them) Biologiya v shkole, 53, 1979, č. 6, pp. 36-40.

In teaching genetics various types of assignments are given to pupils: one of them is to determine on the basis of the genotype of parents the genotype of their progeny. But the laws of genetics function as statistical laws of probability and therefore the pupils should have some basic knowledge of probability theory. The author cites nine examples from various areas of genetics, which can serve as an assignment. Each one includes a formulation of the task, the method of its solution and the correct answer, including an analysis of the aim of the assignment.

PH

KOLEVA, Z.
Iz moyata ichitelska praktika (My teaching experience)
Biologiya i khimiya, 22, 1979, No. 1, pp.42-44.

The article describes the methodological steps which should be taken in class when the foundations of genetics are being taught and the most important notions used in genetics are being explained. The teacher should use ostensive outlines with the help of an overhead projector. These outlines should show the development of gamets and their chromosome structures, which are characteristic for heterozygotic individuals. On the basis of the example of the fruit fly and the disease hemophylia, the principle of heredity can be explained. Various parts of the lesson should be outlines in writing on the blackboard. In the final part of the lesson the pupils should be given individual assignments on the mechanism of heredity.

LR

KOMARNITSKIY, P. A. - SIZOV, S. S.
K voprosu o strukture kursa obshchey biologii (On the problem of the structure of the general biology course)
Biologiya v shkole, 53, 1979, No. 3, pp. 27-29.

The draft of the new general biology syllabus differs only to a small extent from the one in use now. Its drawback is a redundancy of information. The structure of the general biology syllabus should be in accordance with the organization of living matter. The authors suggest the following structuralization of the syllabus: 1. molecular and supra-molecular levels (proteins, nucleic acids, lipids, saccharides), 2. the cellular level (the cell, its metabolism, the ontogeny of the cell), 3. the organism level (the cellular theory of the structure of living matter, the ontogeny of organisms, variability and heredity, the essence and significance of the work of G. Mendel and R. Morgan, contemporary methods used in genetics, human genetics), 4. the supra-organism level (species, food relations between organisms, man and the biosphere, the evolution of organisms.).

FH

KÜHN, A.

Membrantheorie im Unterricht (Membrane theory in teaching)

Biologie in der Schule, 28, 1979, No. 7/8, pp. 312-319. 4 figs.

The author describes how it is possible to modernize the teaching of some biology topics. First he stressed the need to concentrate on essential biological notions which will make it possible for pupils to form correct ideas concerning the cellular structure of living organisms. Often in literature we find the incorrect usage of such terms as protoplasma, cellular plasma, cytoplasma and "basic" plasma. From a didactical point of view it is important to compare plant and animal cells; the author provides a work-sheet for this purpose. For explaining metabolic processes within the plant a very good drawing is provided.

FH

KUHN, A.
Theorie der zellulären Stoff- und Energietransformation im Unterricht (The theory of the cellular transformation of matter and energy in teaching)
Biologie in der Schule, 28, 1979, No. 12, pp. 303-509,
5 figs.

The article is a contribution to the theory of plant metabolism. This teaching concept provides an opportunity to make use of knowledge gained in physics, chemistry and biology. The main aspect studied is the energy and matter intake and output of living substances. The author first deals with assimilation (photosystem I and II, P 700, the transportation of electrons, the development of ATP) and dissimilation (especially the dissimilation of glycids and the relation between processes occuring in cytoplasma and in mitochondria). In conclusion the author cites certain didactival aspects of the problem (the relation between various topics, the need to clarify the relation between structure and function) and makes suggestions for diagrams of photosynthesis and dissimilation.

FH

KURZE, M. et al.
Problemhafte, erziehungsintensive Gestaltung des Themas "Nutzung und Reinhaltung der Gewässer" (The problem teaching and educational effectiveness of the topic "The use of water and its purity")
Biologie in der Schule, 28, 1979, No. 2-3, pp. 90-98.
3 figs., 1 tab.

The biology syllabus for the 9th class includes also the topic "The conservation and utilization of water in the German Democratic Republic" - taught in the course of three teaching lessons; one of these is devoted to "The purity of water". In spite of the fact this is a rather short duration of time, it is assumed that pupils already have some knowledge of the problem from geography teaching in the 9th class. The authors provide three alternatives for implementing this teaching lesson. In the first, verbal impulses are provided as an introduction to the problem, in the second an overhead transparency is used and in the third the teacher begins by quoting the Law on Nature Conservation. In conclusion, the authors cite the relation of this topic to other topics in the biology syllabus for the 9th and 10th classes.

FH

REBROVA, L. V.
Metodika urokov po teme "Obmen veshchestv" (The methodology of a lesson on the topic "Metabolism")
Biologiya v shkole, 53, 1979, No. 6, pp. 26-35.

One of the main notion in biology teaching is that of the metabolism process. It is formed in the teaching of botany, zoology and human biology. In the teaching of general biology, an understanding this notion contributes to the forming of a notion of the material and uniform essence of the world, the material nature of living processes and hence the forming of a scientific world outlook. Problems arise because of the abstract nature of the notion. The topic "metabolism" should be divided into six lessons. The author cites the aims, teaching media and optimum course of each lesson, including specific formulations of questions.

FH

SEHMRAU, W.

Zur Behandlung von Diffusion und Osmose als Grundlage biologischer Transportvorgänge (On teaching diffusion and osmosis as basic biological transportation processes)

Biologie in der Schule, 28, 1979, No. 4, pp. 141-145. 3 figs.

It has been found that pupils do not fully understand the essence of diffusion and osmosis. This is caused by a predominantly verbal approach to teaching and the fact that the essence of the process is not stressed. The point of departure should be the concentration of particles in a solution and their behaviour. The author uses those physical terms which are found in physics textbook for the 6th class and cites his own concept of teaching this topic: the solubility of potassium permanganate in water serves to illustrate the notion of diffusion. Osmosis is defined as diffusion through a semi-permeable membrane.

FH

SEHMRAU, W.

Kongresspositionen in Aktion - ein Stoffabschnitt aus der Genetik unter dieser Sicht (The Congress resolution in action - the section of the syllabus concerning genetics in this context)

Biologie in der Schule, 28, 1979, No. 6, pp. 225-231. 3 figs.

The author discusses the outcome of his own endeavours to teach in a more effective manner the topic "The structure and function of hereditary dispositions". He is especially concerned with the following problems: concentrating attention on required knowledge and skills, problems of interdisciplinary relations with chemistry and working with models, logical aspects of the topic and adhering to the principle of systematical explanations. The author discusses these problems in detail; the focus of attention is concentrated on the problem of logical analysis - the forming of clear notions and terms, facts and relations, logical thinking within a specific context, the repetition of what has been learnt, etc.

FH

SCHIEFER, H.

Missbrauch biologischer Erkenntnisse durch den Imperialismus (The misuse of biological knowledge by imperialism)

Biologie in der Schule, 28, 1979, No. 5, pp. 202-204.

According to the syllabus for the 12th class, pupils should be acquainted with the anti-humanist stands of bourgeois ideology. For implementing this requirement, the topic "Biology and social practice" is best suited and three teaching lessons should be devoted to this problem. Problem approaches to teaching are best suited for this purpose and the author provides suitable suggestions: individual assignments are classified from a factual point of view: weapons for mass destruction, psychological manipulation, biologism. For each of the problems the author cites those aspects which should be stressed.

FH

SCHULTE, H.

Evolution mit anthropologischem Schwerpunkt - ein Unterrichtsvorschlag (Evolution from an anthropological point of view - a suggestion for a teaching topic)

Naturwissenschaften im Unterricht - Biologie, 27, 1979, No. 8, pp. 225-232. 6 figs.

The author discusses various aspects of the phylogeny of man, from the point of view of their use in teaching. The anthropological point of view as a contribution to evolution theory is stressed. This section can be very interesting; its purpose is to show pupils how they themselves can learn to understand problems of the evolution of man. Contemporary textbooks for biology used in the Federal Republic of Germany are analysed by the author and their sections on the phylogeny of man are critically assessed. This topic is taught in the 9th class of basic school. During 5 lessons the following problems are taught: man hundreds of thousands of years ago, where does man come from, primates - man - hominization, evolution as a general biological principle, the causes of the evolution of man - evolution theory, the importance of biological phenomena on the basis of evolution, findings important from the point of view of comparative morphology in the development of man, the importance of various findings for evolutionary theory. The author cites modern opinions concerning the development of man, describes various stages of development, findings pertaining to them and the family tree of amn. This topic makes it easier for pupils to understand the position of man in nature and the pre-historical development of man in the Pleistocene era.

AA

THEUSZ, M.

Reaktivierung von Wissen und Fähigkeitsentwicklung mit Hilfe von Aufgaben (The re-activation of knowledge and the forming of abilities with the help of assignments)

Biologie in der Schule, 28, 1979, No. 5, p. 209.

A collection of assignments on the topic "Organisms and the environment" was a welcome aid to most teachers. The author has several critical comments on this handbook: 1. Some of the assignments are formulated as "repeat the definition of a term", or "repeat a comparison", etc. 2. Some of the criteria for verification and assessment of pupils knowledge are doubtful.

FH

ZABEL, E.

Zur Behandlung des "Stoff- und Energiewechsels" in Klasse 9 (On the teaching of various aspects of metabolism in the 9th class)

Biologie in der Schule, 28, 1979, No. 11, pp. 455-466, 1 fig.

The section of the syllabus which concerns plant cell metabolism can be used to teach general biological problems and to stress the interaction between living and non-living nature. The author discusses methods for implementing the syllabus, the knowledge, pupils achieve and the specific aspects of this topic. He also deals with the problem of improving the quality of teaching: in the author's opinion this concerns above all concentrating on essential aspects of the topic. Also problems of motivation and the forming of problem situations are discussed. Special attention is devoted to the cognitive process and the development of knowledge from a logical point of view.

FH

DIMOVA, S. S.

Uchebno-tekhnicheskiye sredstva pri uroku "Slncheva sistema" v IV klas (Technical teaching media for the topic "The solar system" in the fourth class)
Biologiya i khimiya, 22, 1979, No. 3, pp. 47-50.

The author describes the course of a lesson in the 4th class, where she acquaints pupils with basic scientific knowledge concerning the solar system. She organises the lesson in such a manner that discussions on the pupils' experiences alternate with explanations, during which she uses a kinetic model of the solar system, slides concerning various bodies of the solar system and also slides concerning astronomy, astronauts and the construction of rockets.

All these aids increase the interest of pupils in what they are learning and help to overcome difficulties in learning abstract and difficult sections of the syllabus.

LR

13.1 Verification of results achieved in biology teaching

CICHY, D.

Normy wymagań z biologii w powszechnej szkole średniej
(Standards of requirements in biology in general secondary school)
Biologia w szkole, 32, 1979, No. 5, pp. 213-216, 2 figs. 1 tab.

In order to achieve optimum results in education and teaching in biology in secondary schools a standardization of requirements on the basis of the syllabus are needed. Standardization should concern knowledge, skills and habits and should pertain to the main aims set by the school, the aims set by the teaching subject and those of various parts of the syllabus. The author begins with specific examples(for instance unicellular algae) with which she demonstrates the possibility of determining standards of the performance for pupils. For a passing mark the pupils during the examination should know the following: 1. the classification of unicellular algae, 2. representatives of grass-green algae, 3. an outline of the cellular structure of algae, 4. the environment in which grass-green algae are found, 5. with the help of the teacher produce a microscopic specimen of an algae cell, 6. draw and describe an algae cell. For a very good mark: 7. describe the difference between the structure of various uni-cellular algae, 8. describe the agreement and differences in the structure of algae and other plants, 9. be able to distinguish and determine a drawing of an algae and, 10. describe the structure of diatoms and their place in nature. For an excellent mark: 11. be able to compare the structure of algae cells and some higher aquatic plant, 12. clarify why blue-green algae are the simplest algae, 13. independently make a microscopic specimen of an algae, 14. make and describe independently a drawing of a unicellular algae, 15. provide information on the life and structure of algae with complete understanding. The author in conclusion provides a table of marks and the results achieved in a pilot study.

AA

FRANYÓ, I.
Természettudományos vizsgálatok az általános iskolában
(A nature studies project carried out in basic school)
A biólogia tanitása, 1978, 17, No. 2, pp. 33-40.

On the basis of teaching nature studies in the 5th to 8th classes of basic school the author was able to gather data for a convincing study of media used in the didactics of the natural sciences.

HEINZEL, I.
Zum Aussagewert von Aufgabenlösungen bei der Leistungsermittlung (On the importance of doing assignments for the verification of knowledge)
Biologie in der Schule, 28, 1979, No. 11, pp. 472-493.
4 figs.

Examinations and the verification of knowledge have a very important role to play in teaching. The author first comments on the subjectivity of assessments and then deals with specific examples - the outer structure of fishes. On the basis of the drawing of a fish she cites various opportunities for assignments and their solutions. In conclusion she cites the findings of her own project to verify this approach.

FH

HENRY, L. L. - ROWSEY, R. E.
Comparative Study of the Knowledge of Metric Units of Measure and their Application
Science Education, 62, 1978, No. 3, pp. 283-289.
3 tabs., 2 appendixes.

The article describes a study which examined the implementation of a law from 1975 which instroduced the metric system to the US. For the purpose of this study of the extent of knowledge of the SI system, a population was divided into three age groups. In the introduction to the article the authors acquaint the reader with the frequency and composition of each of these groups, describe twenty various aids designed for the purpose of the project and the methodology used in the study. They cite in detail the outcome of the whole project, which was analysed on the basis of a t-test. The project studied three groups of problems and conclusions are summed up in a table. The appendixes contain specific examples of questions concerning the mutual ratio of metric and non-metric units and their practical applications.

RA

ILIYEVA, R.
Proverkata i otsenkata na znaniyata na uchenitsite - vazhna i postoyanna didakticheska zadacha (Verifying and assessing pupils' knowledge - an important and permanent didactical task)
Biologiya i khimiya, 22, 1979, No. 3, pp. 31-38.

Practical experience indicates that even with the best organization of the educational and teaching process, the outcome of teaching may not be the best. Much depends on methods of verification used an how they are included into the structure of the lesson.

Traditional forms of verification and assessment have been described by P. Angelova in this journal, in issue No. 4, 1974; they include the following:

1. individual oral examinations combined with questions to the whole class,
2. individual oral examinations with the use of static and dynamic ostensive teaching aids,
3. individual oral examinations with the use of slides and slide series,
4. individual oral examinations with the use of a microprojector and a microscope,

5. individual oral examinations combined with the solution of a practical assignment,
6. a direct oral examination
7. a written examination
8. a practical examination
9. an examination with graphic elements.

However, more important than the verification is the method used, i.e. the formulation of the question and assignment in such a way that they lead to thinking and independent application of knowledge on the part of the pupil.

The author supplies various examples of groups of questions on botany in various stages of the teaching process.

In the final part of the article the author analyses the verification of knowledge and the assessment of pupils in the context of the important relationships which exist between teacher and pupil and teacher and parents.

LR

KOVÁCZ, L.
A középiskolai gombaismereti oktatás helyzete egy felmérés tanulságai alapján (Knowledge concerning the Boletus mushroom in secondary school on the basis of tests given to pupils)
A biologia tanitása, 17, 1978, No. 2, pp. 52-54.

On the basis of a test with seven questions the knowledge which pupils have concerning practical mycology was verifies. The findings are analysed.

NOVICK, S. - NUSSBAUM, J.
Junior High School Pupils´ Understanding of the Particulate Nature of Matter: An Interview Study
Science Education, 62, 1978, No. 3, pp. 273-281,
3 figs., 5 tabs., 1 appendix.

The authors describe a study carried out among pupils of Israeli schools who have taken an openning course in physics called "The structure of matter". A written test was considered to be unsuitable for the surpose of the study and therefore the authors chose the form of a Piaget-type interview. The aim was to asses the degree to which pupils understood the essence of a partial model of matter which was used in the course of teaching. In view of the limited time available for the testing interview (30 minutes), the authors concentrated only on some aspects of the problem. The procedures used are described, as well as the methodology of the study. Findings are cited in detail, and summed up in tables. The appendix describes the experiments which werechosen for demonstrating individual aspects.

RA

PANAYOTOV, A. - PETROVA, I. - EVTIMOVA, T.
Za proverkata i otsenkata pri obuchenieto po biologiya
(Concerning verifications and assessments in teaching biology)
Biologiya i khimiya, 22, 1979, No. 5, pp. 26-30.

Biology teachers should become better acquainted with basic theoretical studies concerning the criteria for verifications and assessments - both as a process and its outcome. The criteria for assignments should include the following:
- the quality of biological knowledge and skills which is to be achieved,

- the quality of the skills which have been formed, such as skills in the practical application of what has been learnt,
- the development of cognitive activities in the pupil.

The authors cite pedagogical principles which should be adhered to in the verification of pupils' knowledge and its assessment:

- verification and assessment should take place regularly,
- pupils should be suitably motivated,
- various assignments should be given, as far as their content and degree of difficulty is concerned.

Questions and assignments should be formulated in a correct manner.

LR

REZNIKOVA, V. Z. - MYAGKOVA, A. N. - MASH, R. P.
Povisheniye obyektivnosti proverki i ocenki znaniy, umeniy i navykov uchashchikhsya (Improving the objectivity of verifying and assessing pupils' knowledge, skills and habits)
Biologiya v shkole, 53, 1979, No. 5, pp. 30-34.

During the verification and assessment of pupils' knowledge the negative qualities, of their learning are exposed and this increases their educational impact and also provides the teacher with the opportunity of improving the effectiveness of the teaching process. Criteria assessing pupils' knowledge, skills and habits are of great importance. During teaching, stress should be placed only on essential information and specific biological aspects. Studies have indicated that in practical school teaching an explanation of facts predominates; skills and habits are verified or assessed only rarely. Special attention should be devoted to the cultivation of intellect abilities (comparisons, analyses, generalizations). Also work with books is of insufficient quality, as well as the preparation of experiments, etc. A preconditions for improving the effectiveness of teaching is that pupils should learn reproductive and creative activities, which should be taught in the context of various parts of the syllabus. The authors cite various practical examples. The same oral expressions by different pupils are often assessed in different manners by teachers; this is caused by various criteria and various approaches to the evaluation of errors. Many teachers do not assess positively original and independent answers given by pupils. The utilization of marks in the educational process should not be overlooked. Requirements for the assessment of teaching are cited in the biology syllabus. The article provides the outlines of such requirements, on the basis of specific answers.

PH

WHEELER, A. E. - KASS, H.
Student Misconceptions in Chemical Equilibrium
Science Education, 62, 1978, No. 2, pp. 223-232, 8 tabs.

The authors acquaint the reader with a study to determine student misconceptions as far as chemical equilibrium is concerned. The aim of the study was to determine the extent to which such misconceptions are connected with the ability to perform and with carrying out assignments in chemistry. A test given to participants in the study to determine the degree of misconceptions contained 30 questions with multiple choice answers. The outcome of this and other tests were statistically assessed and summed up in tables.

The findings of the study indicate that before students learn about chemical equilibrium it is necessary to carry out an investigation of the students' cognitive abilities.

RA

13.2 Evaluation of the results achieved in biology teaching

BINDEL, H. J. Jr.

Why Secondary Teachers are Losing Their Students and Their Jobs

The American Biology Teacher, 40, 1978, No. 2, pp. 115-116, 122, 1 tab., lit. 14.

One of the possible explanations for the fact that large numbers of students do not take nature study courses is, in the opinion of the author, the insufficient motivation of teachers. In a summary table the author compares the percentage representation of individual problems cited as primary in the schools in 1970 and 1975. In both years discipline was cited most often. Difficulties in this area, on the basis of the author's experience, are caused predominantly by a lack of motivation both on the part of the teachers and students. Also the findings of a study carried out in high schools in 1976 are cited. In the author's opinion it is necessary above all to form such an atmosphere in class which stimulates the will to study. In conclusion the opinions of Coleman, according to whom the main purpose of school should not be to teach, but rather to develop the personality, as well as the opinions of Classer, Long, Ginotti, Bundy and others are discussed.

RA

BROVKINA, E. T. et al.
O kachestve znaniy uchashchikhsya po botanike i zoologii
(On the quality of pupils' knowledge in botany and zoology)
Biologiya v shkole, 53, 1979, No. 2, pp. 45-49.

In the course of 1978 in a number of schools in the Vitebsk region a verification of the knowledge pupils have in botany and zoology was carried out. The authors, who participated in the project, here publish their findings and explain their points of view of what needs to be done to improve the quality of knowledge. First they deal with botany - they cite the formulations of various questions, the assignments given to pupils and they analyse the answers given by pupils. The most difficult problem is cell division. In zoology the verification project concentrated on a knowledge of basic biological notions and terms related to the evolution of the animal kingdom. It was found that knowledge of evolution theory tends to be formal, knowledge of polytechnical terms was found to be insufficient, as was knowledge in areas concerning nature conservation.

FH

CICHY, D.

Wyniki badań osiagnięć uczniów klasy III szkół eksperymentalnych (Research findings concerning the pupils of the 3rd class of experimental schools)
Biologia w szkole, 32, 1979, No. 3, pp. 111-113.

In 1978 a project to verify the knowledge of pupils in biology and hygiene was carried out in 19 experimental schools. The project was carried out by the Institute for School Syllabi, with the aid of school inspectors. The purpose of the project was to determine the quality of basic knowledge of pupils in general education secondary schools. The pupils of these schools recieved various alternative versions of a test, which included 15 questions. A total of 1050 pupils participated, from the 4th (final) classes (536 pupils took alternative A and 513 pupils alternative B of the tests). The tests concerned knowledge from the 1st to 3rd class in biology and concerned 15 topics; the author acquaints the reader with findings. Pupils from all the schools were able to deal with the questions asked on an average of 63 %, which is somewhat more than the averages achieved in other subject (50 %). It was found that urban schools had an average of 67.01 % and rural schools 66,48 %; thus this differentiation has a minimum effect on the quality of pupils' knowledge. It was also found that the most difficult questions concerned the ecology of water fauna and of animals living in forests. The author analyses both tests in detail.

AA

DEMIRCHEVA, K. - BOYCHEVA, M. - STAVREVA, G.
Profesionalnata informatsiya v urotsite za novi znaniya po biologichnite disciplini i po khimiya (Vocational information in lessons on new findings in biology and chemistry)
Biologiya i khimiya, 22, 1979, No. 2, pp. 35-39.

The teaching subjects biology, chemistry and the foundations of agriculture can contribute to the vocational guidance of pupils. Laboratory and practical excercises, practical training in industrial or agricultural enterprises, excursions and hobby club activities can all make their contribution.

In the part of the article entitled "The Essence and Significance of Vocational Guidance" the syllabi of the above mentioned teaching subjects are analysed from this point of view.

In the part of the article entitled "Obtaining Vocational Information", the authors cite sources of information for teachers which can be passed on to their pupils and the example of some teachers are cited.

In the section of the article entitled "The Processing of Information" the authors describe various assignments which can be given to pupils and also the administrating of various questionnairs to obtain information on how pupils are recieving the vocational information made available to them and how this information influences their vocational plans.

LR

HEMMER, H.

Ein Punktsystem zur Leistungsbewertung im Biologieunterricht der Sekundarstufe I. (A points system for assessing performance in biology teaching in the lower classes of secondary school)

Der mathematische und naturwissenschaftliche Unterricht, 32, 1979, No. 3, pp. 173-176.

The author has developed a points system to assess the performance of pupils in learning biology, which makes it possible to assess their skills in various areas and to combine assessments with improved motivation. Also the independent work of pupils in homework can be assessed, as well as their performance observations and in experiments. The suggested system at the same time reduces to a minimum negative mental prossures and makes it possible to assess pupils with different types of performance and to maintain order in large classes.

AA

HICKMANN, F. M. - KENNEDY, M. H. - McINERNEY, J. D.

Human Genetics Education: Results of BSCS Needs Assessment Surveys

The American Biology Teacher, 40, 1978, No. 5, pp.285-292, 302, 308. 3 figs., 6 tabs., 1 appendix, lit. 12.

The article acquaints the reader with the findings of a study which was carried out within the framework of the Biology Science Curriculum Study. One part of the study concerned the knowledge and motivation of high school and college students. A questionnaire was administered with 64 questions with multiple choice answers. The authors of the article describe in detail the purpose of the project and the methods used. The findings were statistically processed and summed up in tables, which are attached to the article.

Besides a quantitative assessment of the project the authors also provice a qualitative evaluation. Some of the more important findings are briefly characterized in 13 points for discussion. Besides the students, also teachers were the subject of the study. The article provides in detail the findings of this research project and confronts some of the opinions held by students and by teachers. In conclusion the author express the opinion that the number of lessons devoted to teaching human genetics should be increased and cites a number of arguments in favour of such a step.

RA

KABASONOVA, M. - DILKINA, B.
Samostoyatelnata rabota na uchenitsite ot shesti klas v obobshchitelniya urok "Zakonomernosti v raznoobraziyeto na pokritosemenii rasteniya" (Individual work by pupils in the 6th class in the summary lesson devoted to "The laws of development and variability of angiosperms")
Biologiya i khimiya, 22, 1979, No. 2, pp. 26-34, 4 tabs.

The new biology syllabus stresses the creative development of pupils' knowledge. A form of teaching which is recommended in this context is a discussion lesson, everything that has been learnt is repeated in the form of a heuristic conversation, where the teacher points out the most important facts and laws of development in the given section of the syllabus. After this stage a summary lesson should take place, at the conclusion of which a systemization of what has been learnt is carried out.

The authors also discuss how the syllabus should be taught from this point of view and analyse the outcome of written examinations in biology in the 6th class at a basic school in Plovdiv.

LR

KOSINSKI, R. J.
Using Standardized Exams to Assess Teacher Effectiveness
The American Biology Teacher, 40, 1978, No. 1, pp. 27-29.
4 tabs., lit. 9.

The article acquaints the reader with the course and findings of a research project which dealt with the assessment of teacher effectiveness. The study was based on the hypothesis that the performance of instructors in large multiple general biology courses can be assessed on the basis of the averages achieved by their sections in the course of standardized examinations. The author acquaints the reader with the course of such an assessment undertaken at Rutgers College. The aim of the study was to provide answers to three questions:
1. Whether the lecturer influences the outcome of the tests given to his students, 2. Whether teaching has a conclusive relation towards performance in the test, 3. If not, what influences the outcome of tests ?
The findings of the study are summed up in tables for which the author provides detailed answers. In conclusion he comments on his own findings in relation to some data found in the relevant literature.

RA

RADKIEWICZ, J.
Technika pracy umysłowej (The technique of mental work)
Biologia w szkole, 32, 1979, No. 5, pp. 223-225.

Pupils should learn to independently gain knowledge, skills and habits. Self-education, self-learning, individual learning and independent study are all terms which designate a single activity. In the year 1974-75 a research project was carried out to determine how students of secondary and higher schools are able to help themselves in the course of self-education. It was found that the larger part of pupils and students are able to take their own notes and make verbal records. Of the number investigated, 68 % were girls. 7.95 % were capable of independently and completely utilizing the lectures and explanations provided. It was also found that 51 % of the students of medical faculties had learnt to take proper notes already when studying at secondary schools, 60 % had made notes of books studied already when in secondary school, 53 % had made use of various encyclopedias for study, 22 % had used libraties or study rooms, 16 % knew the principles and methods of work with a bibliography and 11 % knew about the elementary techniques of scientific mental work.

AA

SlUYSAREU, A. A. - MUKHIN, U. N.
Kachestvo znaniy po biologii u postupayushchikh v meditsinskiy institut (The quality of biology knowledge of those entering medical school)
Biologiya v shkole, 53, 1979, No. 2, pp. 50-51.

The authors describe their experience obtained during a decade of teaching. They have found that basically, those wanting to study medicine have learnt what has been taught in secondary school, but heir knowledge is often of a formal nature. They do not know how to generalize, how to formulate conclusions, they are able to cite only such examples which are found in textbooks. They lack the skills and habits required for independent work, the ability to analyse and synthetize which form the foundation of abstract thought. All these drawbacks are documented by the authors on basic examples from the botany, zoology, human biology and general biology parts of the syllabus.

FH

STEVENS, R. J.

Discrepancies in Student Evaluation of University Teaching Quality

The American Biology Teacher, 40, 1978, No. 9, pp.534-540, 563, 1 fig., 2 tabs.

The article deals with the problem of assessing the quality of teaching from the point of view of university students. At the University of Wisconsin, where the author teaches, the qualification of professors regularly also includes so-called student evaluations (SE) in various forms. The author concentrates on the form most frequently used - a questionnaire for commenting on the quality of a lecture. After a general introduction a project for studying such assessments is described. A questionnaire was used with 35 items with answers in the form of a scale from 1 to 5. The findings were tabulated by a computer and divided into 7 assessment factors. The final evaluation is in the form of a graph. The author also discusses a so-called long form of questionnaire and describes in detail the questionnaire used for commenting lectures, whose findings are summed up in the form of a table. Another form of student evaluation, which does not require computer tabulation is also described. In the final part of the article the merits and drawbacks of the evaluation systems are discussed.

RA

13.3 School-leaving examinations in biology

BAUMANN, K.

Abiturientprüfungsaufgaben - eine vergleichende Betrachtung (Assignments for school-leaving examinations - a comparative study)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, no. 7, pp. 187-190.

The author discusses the new curriculum for the upper classes of general education secondary schools. He points out various opportunities connected with the written school-leaving examinations and analyses their quality;adescription of how these examinations differ in various regions of the Federal Republic of Germany is provided. The suitability or unsuitability of some questions is a subject of critical analysis. Three topics ar suggested for school-leaving examinations, of which two will be chosen by the relevant ministries; this will provide pupils with the possibility of chosing between two alternatives.

AA

FALKENHAUSEN, E.

Anforderungen und Anspruchsniveau im Biologieunterricht der Sekundarstufe II. (Requirements and the degree of demandingness of biology teaching in the upper classes of secondary school)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 4, pp.97-103.

1 fig., 2 tabs.

The publisher of the journal, K. Dylla, has asked what criteria should be applied to the quality of biology teaching in the upper classes of general education secondary school. The answers are provided by the special counsellor for biology of the Braunschweig district administration, who assesses the topics and quality of the preliminary written part of school-leaving examinations and school-leaving examination itself. This officer has suggested that the demands made upon both these examinations should be the same and that the notions ank knowledge demanded in the examinations be adequate to the age and education of the pupils. Both examinations should concern important problems and notions in which relations to other teaching subjects are also reflected. Biological problems should be dealt with from the point of view of various aspects - including those of a positive relation towards mankind and an orientation towards scientific thinking and work methods. Specific examples are cited. At present these preliminary written examinations indicate that pupils have cognitive difficulties with some notions, with the way in which pupils think and in the highly abstract quality of some of the examinations.

AA

HIRSCHFELD, D.
Klausur für einen Leistungs- oder Grundkurs: Onto- und Phylogenese (Preliminary school-leaving examinations in the work or basic course: Ontogeny and Phylogeny)
Praxis in der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 9, pp. 235-241.

The author discusses the problem of preliminary written school-leaving examinations, especially those concerning ontogeny and phylogeny. In order to write the examination paper the pupils must have knowledge on the evolution of organisms and other partial areas of biology. At the time these examinations take place, pupils are studying embryology and in practical excercises dealing with the development of a chicken in comparison to the development of a fish, amphibian, reptile and man. The notion of homology is formed and anatomy and morphology are compared from the point of view of phylogeny; use is also made of genetics and ethology. Thus the preliminary written part of the examination is directly connected with their class work. The pupils have five hours for the written examination.

AA

KNIEVEL, F.
Von den Tücken der Klausur (On the tricky nature of the written preliminary school-leaving examination)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 1, pp.13-21, 4 diagr., 1 fig.

The author criticises the present situation in the preliminary written school-leaving examination which serves to prepare pupils for the school-leaving examination proper. In the author's opinion it would be best to unify and centrally determine the topic of this examination. Opinions differ a great deal on this subject. The author describes the difficulties connected with the writing of an essay on Megalocyclops viridis, which requires a comprehensive analysis of the problem, a very wide theoretical foundation and the activation of knowledge from a number of biological areas (sexual reproduction, meiosis, determining sex during the course of development of the embryo, modifications, selection, population genetics, ecology, etc.). The pupil has five hours for writting the essay. These exams should be better founded in biology teaching, the formulation of the assignment should be very precise and based on complete information, it should assume alternative solutions and also errors. Realistical approaches concerning the possibilities of pupils should be stressed. Also all stages of the assignment should be formulated precisely as well the keys provided for solving the assignment. The outcome should be assessed on the basis of uniform criteria.

AA

MAJECKA, Z. - KRAWCZYKOWSKA, J.
O doborze tematyki egzaminu dojrzalości z biologii
(On chosing a topic for school-leaving examinations in biology)
Biologia w szkole, 32, 1979, No. 2, pp. 67-70.

On the basis of Examination Regulations, pupils in Polish general education secondary schools can take the school-leaving examination in biology either orally or in wirtten form. The authors here provide criticism of the topics selected for this examination. The majority of topics are purely theoretical, too general and in the majority of cases they overreach the ability of the pupil to deal with them in the time available. A written school-leaving examination in biology should be chosen by those pupils who have a special interest in biology. This written assignment is of a research nature and the pupils can make use of observations and experiments. The authors cite various suitable topics for this purpose, such as the influence of fertilization on the growth and development of spring wheat, reflexive movements of aquarium fishes, the influence of a lack of vitamins A and D on the weight and correct development of animal organs (a rabbit, mouse, guinea pig, chicken, etc.). Theoretical work can be based on a study and analysis of literature, for instance a clarification of the mechanism which controls and regulates blood circulation. Also topics which correlate with other natural science subjects such as physics, geology or geography are very suitable; such a topic is for instance the activity of digestive enzymes and proteins. The authors also discuss the rules for marking and assessing these essays, as well as the evalution of oral examinations in biology. Aspects of biological technology should also form a part of the examination. An analysis of entrance examinations to institutions of higher learning has indicated that teachers tend to deal with some topics too extensively, while others are dealt with only superficially (for instance ecology, physiology, nature conservation). There are often difficulties in organizing pupils' practical work during the examination. When biology has been properly taught, there are no problems with this subject during entrance examinations to institutions of higher learning.

AA

RUPPOLT, W.

Aufgabestellung, Bearbeitung und Auswertung einer Reifeprüfungsausgabe (Formulating an assignment, the method of dealing with it and its utilization during school-leaving examinations)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 5, pp. 125-128.

The author describes the use of chromatography of thin layers for distinguishing the basic structural elements of proteins, saccharides, essential oils, alkaloids and plant dyes during the practical part of the school-leaving examination in secondary school.

The object used was chlorophyll from five different species of dead nettle. The procedures used are described and their assessment. The project took six hours. It is demanding from the point of view of teachers but optimum for pupils.

AA

RUPPOLT, W.
Vorschlag für die schriftliche Aufgabe im Leistungsfach Biologie (Suggestions for topics for written biology examinations)
Praxis der Naturwissenschaften- Biologie im Unterricht der Schulen, 28, 1979, No. 10, pp. 264-267.

The author provides information on the study of biology in the first three terms. In the first term ethology was studies, in the second problems of ecology and man, flora and fauna and their environment and in the third term problems of evolution. In the second term the hypothesis of the symbiotic development of the cell was studied. In all three terms pupils prepared papers on the basis of recommended literature. Of five weekly lessons, three were devoted to a study of broad topics and two to practical work, such as microscopy, observations, drawing, describing and carrying out experiments. The author suggests a written project - pupils are given an assignment using chromatography, where they are asked to identify the specie relatedness of five different plants (five different solutions of raw chlorophyll). Besides this main task, there are also lesser tasks - for instance on the basis of chromatography to describe essential oils found in leaved of plants given to pupils. They are also asked to explain the origine of chlorophyll in leaves in the course of evolution, to explain what essential oils are, how they develop, which plant families they are found in and what is their significance for plants. Also an olifactory analysis is carried out. The author describes the course of the work and its outcome. The average marks achieved in this work were between 2 and 2.5.

AA

TAMIR, P.
The Potential Role of Examinations in Innovate Curricula
The American Biology Teacher, 40, 1978, No. 7, pp.426-428.

For many years the US has played a leading role in dessigning curricula and the use of standardized tests. At present these methods are being criticised. One possible improvement would be changes in existing testing procedures. In the article, the author seeks an answer to the question of whether examinations should be considered an integral part of the curriculum. He cites the example of students in Israel who study biology on the basis of the yellow version of the BSCS program. A survey of various types of examinations used in different schools is given. Special attention is devoted to school-leaving examinations which have a practical and written part. Criteria for the assessment of various parts of these examinations are described - these include the determination of flora and fauna, oral examinations based on individual observations carried out by the student in the past year, laboratory work- and criteria for assessing all three parts of the written test. In conclusion the article sums up the current use and development of the described type of test.

HA

13.5 Examinations in biology

GRÜNEBERG, U., KOPPRASCH, G.
Zur Auswertung und Vorbereitung der Prüfungen im Fach Biologie (Concerning the assessment and preparation of biology examinations)
Biologie in der Schule, 28, 1979, No. 1, pp.9-14.
7 tabs.

In the 10th and/or 12th class pupils prepare for completing their school education. During final and school-leaving examinations they demonstrate the degree to which they are capable of repeating and applying the knowledge and skills they have gained. The article first deals with an assessment of written school-leaving examinations, where it is possible to chose one of four topics, which the authors analyse in detail. They also discuss the outcome of oral examinations and formulate several conclusions for further development in biology teaching.

FH

14. The biology teacher

DEAN, D. S.
The Nonmajor: A Challange and a Responsibility
The American Biology Teacher, 40, 1978, No. 9, pp.564-565.

The article deals with the problem of biology teachers who do not have degrees in biology. In recent times the importance of these teachers has been increasing. The author mentions ten points to help teachers who do not have degrees. Often they are just as qualified as those with degrees and among them are many biology enthusiasts who bring to teaching their rich special knowledge. Courses for such teachers should be planned in a responsible manner, not only as introductions to other subjects. A difficult aspect of the work of these teachers is the composition of their classes, which often contain students of varied abilities. The article also deals with the attitude of students towards biology, the role of facts and thinking in teaching, the problem of specializations and concentrating on a narrow field of problems, etc.

RA

14.1 What is required of the biology teacher

BUTZOW, J. W. - QUERESHI, Z.
Science Teachers' Competencies: A Practical Approach
Science Education, 62, 1978, No. 1, pp. 59-66. 2 tabs.

In recent years a great deal of attention has been devoted to the problem of the competence of high school teachers. The aim of the article is to define the competencies of a science teacher and attempt to assess them. A total of 21 high school science teachers from the state of Maine were chosen for participation in a study project. The method of the project is analysed in detail. 10-20 minute sequences of teaching of each teacher were recorded on a tape recorder and film. The teachers were able to express their opinion on what qualification a high school teacher should have. From their replies a scale of 12 points was formed which a teacher should have. Some of the items are analysed in detail.

RA

JONES, D. R. - HARTY, H.
Instructional and Classroom Management Preferences of Secondary School Science Teachers
Science Education, 62, 1978, No. 1, pp. 1-9, 1 tab.

The article acquaints the reader with the findings of a research project aimed at determining the extent to which secondary school science teachers have a clear preference for their selected approach to classwork. The project aimed at determining whether there is a relationship between the choice of the teacher's instructional method and his orientation in classroom management. After a general introduction, in which the author quotes the relevant literature, the methodology of the project is cited in detail. Data was obtained in two ways - the traditional and on the basis of a questionnaire. In an extensive discussion the authors analyse the findings. The article aims at inspiring and stimulating other similar research projects concerning the opinions of secondary school teachers on the situation in which they teach.

RA

SUNAL, D. W.
Relationship of Science Skill Performance to Preservice Teaching Behaviour
Science Education, 62, 1980, No. 2, pp. 187-194. 3 tabs.

The article acquaints the reader with the findings of a research project which dealt with the problem of whether a relation exists between the ability to perform specific skills and teaching behaviour among future teachers in basic schools. Skills in the natural sciences are defined for this purpose as a set of 14 basic integrated skills taken from the SAPA curriculum. Students from the University of Maryland were included into the project, which concerned four aspects: skills acquired in a course on nature science methods, testing the quality of skills being demonstrated, a study of bahaviour during teaching and an analysis of results achieved. This data is summed up in tables, which are described in detail.

RA

14.2 Teacher training in full-time, inservice and postgraduate courses at pedagogical and natural science faculties, pedagogical practical training

BAILEY, G. D. - JAMES, R. K.
Model for an Inservice Science Teacher Training Program
Science Education, 62, 1978, No. 1, pp. 47-52, 1 fig.

The article criticies inservice training programs and courses for science teachers. The authors concentrate on the draft of a new type of program called Study of Immediate Changes in the Curriculum, whose primary aim is to train participants to play a leading role in applying the program in their own school or institution. In developing the program, four aspects were taken into account - forming leadership qualities, abilities for self-education, opportunities for adapting a program and the system of organization. These four aspects are analysed in detail. The text includes a graphic outline of all four aspects needed for the successful application of the program.

RA

BLOSSER, P.
An Alternative to the M. A. T. Program
Science Education, 62, 1978, No. 3, pp. 309-317, 1 tab.

The article describes a program designed at the Mathematics and Natural Sciences Faculty of the University of Ohio. Its aim is to train those who have a degree in mathematics or in the natural science to teach these subjects in high school. The program was first tested for three years with 42 students. Because at present no mathematician is participating in the program, the article discusses only the natural science part of the program. First initial requirements are described, which depend upon the aims the student sets for himself. Then a general survey of the program is provided. Those who aim at gaining a Master of Arts degree must take all five parts of the program. A degree can also be obtained after three terms of practical work, if good marks are achieved in theoretical exams. The author describes the curriculum of each term. In contrast to classical methods of gaining a M.A. degree, there are alternative programs offered by the University of Ohio. In conclusion the author provides information on a research projects undertaken in connection with this program and its findings.

RA

CUMMINGS, S. L.

So: Your Want to Teach Outdoors

The American Biology Teacher, 40, 1978, No. 3, pp.172-174, 2 figs.

There are essentially two approaches to teaching outdoors: a recreational one or an academic one. The article deals in detail with the latter. The conditions which must be fulfilled for acceptance to a course in outdoor teaching are described: graduation from a four year college course and four other criteria: a firm professional basis, a sense of professionalism, the ability and knowledge needed for communication and suitable personality traits. The author describes job opportunities after graduation. There is also brief information on what the graduate can expect as an outdoor teacher after graduation from the two-year course. Some of the advantages of this profession are described and a list of institutions which employ such specialists. In conclusion several items of advice are offered.

RA

FAUSTUS, L.

Příprava učitelů přírodopisu na nové pojetí výchovně vzdělávaci práce (The training of nature science teachers for the new concept of educational and teaching work)

Přírodní vědy ve škole, 30, 1978/79, No. 9, pp. 327-329.

The training of nature science teachers for the new concept of teaching will take place gradually during a four year period. Precise organizational instructions have been prepared by the Ministries of Education of the Czech Republic and of Slovakia. The aim of training teachers for this purpose is to acquaint them in detail with the new concept of their teaching subject and the new approach of both teachers and pupils to learning. Also included in the program is important information on the natural sciences and new topics which have been included into the syllabus, especially from a methodological point of view. Also training in laboratory work and experiments will be stressed.

The training curriculum for teachers of basic schools is divided into two parts: an introductory, which concentrates on the teaching subject as a whole in the scope taught at basic school and a specialized part which aims at specific aspects of teaching in individual classes.

VČ

MAJECKA, Z.
Praktyki studentów biologii (Practical training of biology students)
Biologia w szkole, 32, 1979, No. 4, pp.163-166.

Teacher training assumes that Pedagogical Faculties carry out a number of tasks which will prepare future teachers for their work in school and which will include their education in the special field they will teach (for instance biology) and in the techniques by which the given subject is taught (for instance observations and experiments carried out in school.) An education student must learn not only science, but also the didactics of the subject and pedagogics. Also training in the area of the student's world outlook is important. The didactics of biology are taught at the pedagogical faculty in the 3rd and 4th years of study, while in the 1st and 2nd years the students undergo training in general pedagogics, general and development psychology and the history of education. Students in the 3rd year of study take practical training courses at two local basic schools and in the 4th year of study at three different general education secondary schools, where they participate in teaching lessons and in one lesson they themselves teach. The author describes the course of this praotical training in detail. The duration of practical training in a basic school is three weeks in the 3rd year of study, and three weeks in the 4th year of study.

AA

PERENDY, M.
Az egyetemi tanárképzés és a gimnázium biológia
(Training teachers at a university and biology teaching)
A biológia tanitása, 17, 1978, No. 2, pp. 43-46.

The author analyses the relationship between the content of the university curriculum and the opportunities for the implementation of this knowledge when teaching school, on the basis of the example of the students of education, who specialize in biology at the E. Lorand University.

PIASECKA, J. - LASKOWSKA-MAŃKO, A.
Wykorzystanie technicznych środkow nauczania (Using technical teaching media)
Biologia w szkole, 32, 1979, No. 1, pp. 16-19, 2 figs.

The authors discuss the problem of new biology syllabi for teacher training at pedagogical schools. These syllabi have been in use since the school year 1963-74. The study course is 4 years and includes various subjects. In the 1st year of study the foundations of biology, botany and zoology are taught; in the 2nd year of study, biochemistry, biogeography, human anatomy and zoology are taught, in the 3rd year course plant physiology, animal physiology, microbiology and the foundations of immunology, as well as general genetics, the biology of the cell and development biology are taught. In the 3rd year course also two papers are written in chosen specializations and there is a 6 hour weekly laboratory period. In the fourth year course the evolution of the organic world is taught, as well as ecology and nature conservation, and three monographical lectures; three different papers in chosen specializations are also written. Besides biology, also other subjects are taught: in the 1st year course organic chemistry, general chemistry and analytical chemistry, as well as physics for biologists, pedagogical psychology, political economy, logic, Russian and an Western language. In the 2nd year course organic chemistry, physical chemistry, statistical methods in biology, pedagogics, technical teaching media, Marxist philosophy and the theory of social development, as well as Russian and Western language are taught. In the 3rd year course school hygiene, the didactics of biology, selected chapters in general philosophy and sociology and the foundations of political science are taught. In the 4th year course only the didactics of biology are added.

AA

REMBELSKI, M.

Praktyki studenckie w szkołach (Practical training of students in schools)

Biologia w szkole, 32, 1979, No. 1, p. 19.

The general education secondary school in Bodzentyn organizes the practical training of education students from the University of Krakow and from the

Pedagogical Institute in Kielce. The practical training takes one month. Students participate in class work, and organizational forms. At the close of the one month period their work is concentrated into a single class, where they prepare essays concerning some larger topic. In conclusion the students prepare tests to verify the pupils' knowledge and also the outcome of their own activities. During their months' stay in the school the students also participate in extra-curricula and hobby club activities.

AA

TAMIR, P. - LUNETTA, V. N. - YAGER, R. E.
Science Teacher Education: An Assessment Inventory
Science Education, 62, 1978, No. 1, pp. 85-94.

The article provides a survey which aims at simplifying communication and to assess programs and aims of the education which high school science teachers receive. Because the education of teachers has until recently not received sufficient attention, the authors have compiled a so-called assessment inventory, which is described in detail. The basis of the inventory can be found in an article by the authors published in the journal "School Science and Mathematics", where the characteristics and basic principles of an ideal training program of teachers is described. Individual characteristics are analysed in detail.

RA

WAGBNER, A.

Entwurf eines Beurteilungsmodells für das Gutachten zur 2. Lehramtsprüfung im Fach Biologie. (The draft of a model assessment for the purpose of the 2nd examination taken by biology teachers) Naturwissenschaften im Unterricht - Biologie, 27, 1979, No. 6, pp. 172-176, 3 tabs.

On the basis of the author's own experiences he provides an critical analysis of older and newer curricula for teacher training in biology for basic, secondary technical and special schools and a model for the critical and uniform assessment of written examinations taken by these teachers. In teacher training in the Federal Republic of Germany, in the course of the second stage-after candidates have already obtained their teacher certificate - the existing third year of study is reduced, so that the whole study course lasts only 18 months.

For purpose of comparisons:

structure of course	3-year program	18-months program
teaching	2 691 hours	468
visits to class	-	308
study days	30 days	-
meetings, seminars	24	6
meetings, organizing 2nd special seminar	-	12
lessons visited by inspectors	6	-
school pedagogical seminars	145 hours	116
2nd special seminar	290	116

AA

14.3 Public activities of teachers, work in District and Regional Pedagogical Associations, assessement of a teacher's work in school, school inspectors

FREJLAK, S.

Organizacja pracy własnej nauczyciela (The organization of a teacher's own work)

Biologia w szkole, 32, 1979, No. 3, pp. 108-111.

In the period of transition to the new educational and teaching system in Poland, each teacher should continue in the systematic extention, broadening and improving of his own specialized knowledge, that his didactical skills should improve and he should organize his own work in an optimum manner. The contemporary development of biology and the current tasks of the school system require high qualification of all teachers and their ability to select an integrate various teaching programs. This in turn requires cooperation with institutions of higher learning, with scientific research institutes in biology and with various scientific and pedagogical societies, as well as the study of new literature pertaining to biology; also the teacher's own library should be added to and scientific and professional periodicals regularly read. Much depends on how schoolwork is planned. At the beginning of the school year all material needed for the independent work of pupils should be gathered, material needed for practical excercises found, etc. Also criteria for the assessment of pupils should be reconsidered, as well as methods used for recording and documenting their progress. The organization and preparation of biological competitions should not be overlooked; pupils should be organized towards cultivating plants and breeding animals and the biology stock room should be extended. A calendar of work on the school plot of land should be drawn up, as well as a calendar of excursions, plant cultivation and animal breeding.

RA

CHAPPETTA, E. L. - COLLETTE, A. T.

Sedondary Science Teacher Skills Identified by Science Supervisors

Science Education, 62, 1978, No. 1, pp. 67-71, 2 tabs.

For more than 50 years theory has been attempting to determine those teacher skills which influence the effectiveness of teaching. The aim of the present paper is to determine those traits which every secondary school science teacher should have. For this purpose the experience of science supervisors have been studied on the basis of a selection of those supervisors who have a close relation to secondary school teaching. They are best able to observe teachers in various situations. A sample of 23 x 1000members of the National Association of Supervisors were chosen for this purpose. The "Delphi" method was used for the project, which is described in detail in the article. The whole project was divided into three parts. Replies were divided into three categories - concerning cognitive, affective and personal characteristics. The findings were assessed statistically.

RA

PODSTOLSKA, M.
O pracy wizytatorów metodykow przedmiotowych (On the work of supervisors and their visits to class)
Biologia w szkole, 32, 1979, No. 2, pp. 64-66.

The Ministry of Education has summed up the findings of its investigations into the work of school supervisors for various teaching subjects in the whole country. The article deals with findings concerning three regions of the country: Skierniewice, Tarnów and Slupsk. Biology supervisors in the regions are experienced teachers, who have worked in schools at least 15 to 20 years. They help other biology teachers both from a scientific and methodological point of view, they assess and inspect their work. They are available to teachers for help in preparing difficult parts of the syllabus for teaching, provide various instructions concerning the teaching subject, provide teachers with various supplementary material, tests, information on innovations in didactical media and specialized literature and help teachers to solve their individual problems. Two to five times a year various conferences are organised for teachers where current problems of teaching and of the school reform under way are dealt with, as well as the modernization of the educational process and of biology teaching, methods for the verification and assessment of pupils knowledge and the newest findings of biological sciences. Some regional supervisors organize study groups for teachers in inservice training. They also act as inspectors of the work done by teachers and participate in increasing teachers´ qualifications, the introduction of new teaching media and the forming of a good atmosphere in schools, which is conductive to work.

AA

14.4 Doctoral theses in the didactics of biology

CICHY, D. - MAJECKA, Z.

Prace magisterskie z dydaktyki biologii (Master theses in the didactics of biology)

Biologia w szkole, 32, 1979, No. 5, pp. 204-206

At the Pedagogical Institute at Kielce students have expressed their interest in working for a masters (magister) degree already from the 2nd year of study. In the 3rd year course such a student must chose a topic for writing a thesis and participate in seminars pertaining to this work. During the first stage, the relevant literature is studied and an outline of the thesis is prepared. In the 2nd stage of the work this outline is made more precise and the student participates in seminars pertaining to his chosen subject, and draws up a plan of work. In the 3rd stage the student prepares a report on how his work is progressing and discusses selected problems from the thesis with collegues within a seminar. The authors cite the titles of theses written on the didactics of biology. They concentrate on problems connected with the new model of education and teaching in Polish schools. Also procedures used in assessing the theses and their defense are described.

AA

14.5 Self-education of biology teachers

CARTER, J. L.

Communicating Biology Through Continuing Education

The American Biology Teacher, 40, 1978, No. 2, pp. 78-81.

Lit. 5.

In this article the author considers the problem of the successful influencing of students by a teacher. The aim of every teacher should be to educate students who after graduation continue in self-education; what has been learnt should be implemented in everyday life and passed on to future generations. This aim is based, in the author's opinion, on two assumptions: The first is the need for two forms of education - that available to the broad public and that which is available only to a small number of those with special interests. The author in this context stresses the necessity of life-long education, which also would include education for older age groups than has been the case until now. The second assumption is the need of government subsidies for all levels of education. In this context the author discusses various educational programs, especially so-called Science for Citizens programs. In conclusion the author formulates specific tasks, such as the need to assess existing educational programs and to determine what will stimulate adults to further study.

RA

14.6 Pedagogical readings

BEREUTSINA, L. P.

V. vsesoyuzniye pedagogicheskiye chteniye (The Vth All-Union Pedagogical Reading)

Biologiya v shkole, 53, 1979, No. 4, pp. 74-76

A pedagogical reading on the topic "The Communist Education of Pupils in the Process of Learning the Foundations of Science" was held from May 15th to 18th in Alma Ata. The introductory speech was made by the Minister of Education of the USSR, M. A. Prokofiev. The section on "Communist education of pupils in the process of learning the foundations of the natural and mathematical sciences" also heard the readings of five biology teachers; the sub-section on "The Education of pupils in the course of biology teaching" heard a total 29 essays, which are analysed by the author.

FH.

ROŠICKÁ, L.

Pedagogické čtení M. Vackové - příspěvek k zvýšení účinnosti výuky (The pedagogical readings of M. Vacková - a contribution to improving the effectiveness of teaching)

Přírodní vědy ve škole, 30, 1978/79, No. 2, pp. 50-54, 7 figs, 1 tab.

The pedagogical readings of M. Vacková deal with the problem of how to better acquaint urban children with nature and its various aspects, so as to teach them to correctly understand nature, conserve and love it. It is important in this context to make teaching ostensible; in nature studies this assumes above all independent observations and experiments with living specimens in class, on school plots of land and also the use of various natural specimens in class. The author describes the correct approach to a teaching lesson on the example of the topic Angiosperms - the family Betula.

VČ

14.7 Biological meetings, conferences, specialized commissions, teaching-subject committees, international biological activities.

Arbeitstagung der Sektion Fachdidaktik im Verband Deutscher Biologen (A meeting of the section on special didactics of the Association of German Biologists)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 5, p. 135.

A meeting of the section on special didactics of the Association of German Biologists was held on September 17th do 21st, 1979, in Bad Boll (near Göpping). The main topic of the meeting was "The didactics of biology as a science". During the first two days basic aspects of this topic were dealt with, while the remainder was devoted to discussion and communications of findings. One day was devoted to a day-long excursion to the Alpine foothills. During two days various sections met to discuss educational models and the further education of teachers. Audio-visual media in the development of the didactics of biology and empirical studies in the didactics of biology were also discussed.

AA

BAER, H. W.

Vorinformation zu den XVII. Schulbiologentagen 1980 (Preliminary information on the XVII. Congress of School Biology, to be held in 1980)
Biologie in der Schule, 28, 1979, No. 9, p. 391.

The XVIIth Congress of School Biology will be held in Rostock in the G.D.R. on May 10th to 13th 1980, The main topic of the Congress will be: The Basic Syllabus and Interdisciplinary Relations in Biology Teaching. The papers presented to the Congress and the discussion will also concern the theory of basic learning, the theory of interdisciplinary relations, etc. The article formulates the aim of the Congress, its program of excursions and various organizational aspects.

PH

BAUMANN, K.

Die 110. Versammlung der Gesellschaft Deutscher Naturforscher und Ärzte (The 110th assembly of the Society of German Natural Scientists and Physicians)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 8, pp. 217-222.

The 110th assembly of the Society of German Natural Scientists and Physicians in Innsbruk was attended by 1 300 members. The main topic of the meeting was "The Natural Science Image of the Contemporary World, its Foundations and Building Components". Prof. Glohn presented a paper called "An ice age or a warm period ?", prof. Wittmann spoke on "Ribosomes and protein synthesis", Teschemacher spoke on

"Opiate receptors and endorphines, the bodies' own substances which bond opiate receptors", prof. Hertling spoke on "Sympathetic neurons", prof. Gerok spoke on "Defects in cellular receptors as the cause of endocrinological and metabolic disease", where he explained that so-called senile diabetes is not in fact a disease of the pancreas, but is caused by the insufficient function of liver cells which have a decreasing ability to bond insulin. He also spoke about new findings concerning toxic infarctus of the myocard can occur already at the age of 18 months. Blobel spoke about "The synthesis of proteins and cellular components". The meeting was concluded by a panel discussion on the topic "Why Research ?".

AA

Bericht über die Tagung der Sektion Fachdidaktik im VDB in Bad Boll (17.-21.9.1979) (A report on a meeting of the section on specialized didactics of the Association of German Biologists in Bad Boll on 17.-21.9.1979)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No. 12, pp. 381-382.

A meeting of the section on the didactics of biology of the Association of German Biologists met in Bad Boll from September 17th to 21st 1979. The main topic of the meeting was: The Didactics of Biology as a Science. Over 100 specialists in didactics from institutions of higher learning, research institutes, seminars for the further education of teachers and teachers from schools in the Federal Republic of Germany, Austria, Switzerland and the Netherlands participated. The meeting was chaired by dr. Rodi. Such problems as what universities can do for teachers, what the universities expect from secondary schools, what specialists in biology consider the tasks of the didactics of biology to be and the problem of the didactics of biology as a scientific discipline were also discussed. Educational models, the further education of teachers, as well as empirical research in the didactics of biology and methods of this research were also the subject interest.

AA

Biologie-Géologie un enseignement ... une éducation ...
(Biology, geology , teaching ... education ....)
Biologie, Géologie, 66, 1979, No. 4, p. 577-623,
12 figs.

The biological and geological sciences have an important role to play in the education of children, until they become adults, because these disciplines lead to an understanding of the responsibility of the individual towards society and nature.

At the beginning of December 1979 the French Association of Professors of Biology and Geology in Public Education held a week-long Congress, at the Sabatiér University in Paris, in which three hundred teachers of both subjects participated. Besides many journalists also important personages were present, including foremost scientists and members of the French Academy, as well as Nobel prize laurates, etc. They all stressed the importance of these subjects in secondary school education. The quarterly journal Biologie, Géologie is publishing a number of papers and speeches from the Congress.

LH

Biologiyata v sluzhba na choloveka. Nauchna konferentsiya po biologiya (Biology in the service of man. A scientific biological conference)
Biologiya i khimiya, 22, 1979, No. 2, pp. 60-62.

"The 21st century - the century of biology": with these words Academician Khristo Daskalov openned on February 13th, 1979 in Sofia a two-day scientific conference on biology, which was organized by the Bulgarian Academy of Sciences.

Problems concerning the future of our planet, of the nutrition of mankind, the quality of the population and the conservation of the natural environment were the subject of the papers presented and the discussions held. The conference was terminated with the slogan "Biology into the services of manking !"

Immediately after the conference a nation-wide meeting was held concerning the teaching of biology in secondary schools, in the 9th and 10th classes. School inspectors, teachers and experts in methodology from the whole country participated.

LR

BREZHNEV, L.
Po zavetam Lenina - uchastnikam vsesoyuznogo sleta predstaviteley trudovikh obedneniy shkolnikov (Lenin's heritage - to the participants of the All-Union meeting of representatives of pupils' work brigades)
Biologiya v shkole, 53, 1979, No. 5, p. 3.

A greeting sent by L. Brezhnev to this meeting, which expresses gratitude to children for the successful implementation of the resolutions of the XXVth Congress of the Communist Party of the Soviet Union. Work brigades contribute to forming the character traits of the builders of Communism. Workers, collective farm members and teachers who work as leaders of these brigades have thus all contributed to the education of children. L. Brezhnev reminded the children of the worker-heros of the first five-year plans and expressed the hope that youth will continue to implement the heritage which V. I. Lenin has left.

FH

FRITSCH, H.

Erster Erfahrungsaustausch der Biologielehrer der EOS-Stufe im Kreis Oranienburg (The first exchange of experiences among biology teachers in general education secondary schools in the district of Oranienburg)
Biologie in der Schule, 28, 1979, No. 10, pp. 434-435.

In this year for the first time a course on pedagogics and psychology was held in which teachers were acquainted with the "Program for the Further Scientific and Dicatical Education in Biology". Part of the course was a visit to a biology lesson in the 12th class, where the characteristics of DNA were being taught. The author analyses the course and structure of the lesson.

FH

GANEV, Z.

Natsionalna konferenciya po biologiya (A national biology conference)
Biologiya i khimiya, 22, 1979, No. 1, p. 55.

On September 4th and 5th 1979 a national conference on biology was organized in Veliko Trnovo by the Ministry of National Education. More than 600 delegates from the whole country participated. The conference concentrated on problems concerning ecology, the relation between man and nature, problems of cellular metabolism, etc. Other important items on the agenda were the subject of biology teaching in all types of schools, the approach to laboratory work and practical excercises and the difficulties connected with their use.

LR

GANEV, P.
Rolyata na prakticheskata deynost po biologiya za vazpitaniyeto i obuchenieto na uchenitsite (The role of practical biological activities in education and in teaching)
Biologiya i khimiya, 22, 1979, No. 3, pp. 61-62.

From October 17th to 19th 1978 in Prague, Czechoslovakia, a biology conference took place on the problem of including practical work into the syllabus and on work as an educational medium which aims at winning over pupils for work and their vocational guidance.

The three-day conference heard a number of papers from the staff of the Research Institute of Pedagogics, the Ministry of Education in Prague and from educators from 8 countries of the world.

Participants in the conference also visited the J. Kepler general education secondary school in Prague 6, where they became acquainted with the course of the teaching experiment taking place there.

LR

GEBAUER, I.
Aus der Arbeit unseres Biologiezirkels (On the activities of our committee for the teaching subject biology)
Biologie in der Schule, 28, 1979, No. 12, pp. 516-517.

One of the prerequisites for implementing the requirements formulated in the syllabus is a proper selection of teaching media from the point of view of their content and aims, as well as correct didactical utilization. In the district of Magdeburg it has become a matter of course that members of the teaching subject committee on biology develop new teaching media. At one meeting of the committee teachers discussed the use of cassette films for teaching genetics. Another meeting visited a biology class and later assessed the application of knowledge by pupils in the course of class work.On the basis of its systematic work the committee was successful in achieving a situation where every teacher, when preparing and planning class work, take into consideration seven principles, which are enumerated.

PH

GEHLHAAR, K. H.
XVI. Schulbiologentage in Magdeburg vom 14. bis 17. Mai 1979 zum Thema "Literarische Arbeitsmittel und ihr Einsatz für die biologische Bildung und Erziehung der Schüler" (The XVIth conference on school biology in Magdeburg, held from May 14th do 17th 1979, on the topic "Literary Media and their Use in Teaching")
Biologie in der Schule, 28, 1979, No. 9, pp. 383-386.

The author describes in detail the organization, aims of individual sections and content of papers presented at the international conference cited in the title. A total of 6 papers were presented at the plenary session of the conference and 45 papers were presented in three sections. 265 specialists in methodology participated in the conference; of this number one was from the Soviet Union, 18 from Poland, two from Hungary and 4 from Czechoslovakia.

HORNÍK, F.

XV. mezinárodní konference o problematice výuky biologie (The XVth international conference on problems of biology teaching)

Přírodní vědy ve škole, 30, 1978/79, No. 1, p. 13.

The main topic of the conference was: The Outcome and Development Trends in the Biological Sciences and Biology Teaching as a Cognitive and Educationally Effective Process. It was held on May 6th to 9th 1978 in Berlin. Papers were presented by specialists in biology such as prof. Tembrock, who spoke on behaviour and communication, prof. Göring who spoke on hormonal regulation processes of aging in plants and prof. Nürnberg, who spoke on the genetic aspects of plant cultivation. The conference met in four sections and the discussion concentrated mainly on problems of selecting aims, the structuralization of the syllabus, basic knowledge and interdisciplinary relations.

VČ

YEFIMOVA, V. I.

Vserossiyskiy slet chlenov shkolnikh lesnichestv i yunikh druzej prirody (The All-Union gathering of members of forestry brigades and young friends of nature)

Biologiya v shkole, 53, 1979, No. 6, pp. 46-48.

The meeting was held on July 21st to 26th 1979 with 800 participants, who were the victors of school, district, town, regional and republican meetings. The author describes the various competitions and their aims, the number of participants and the victors. Competitions were held in five specializations.

FH

KATTMANN, U.

Bericht über das IV. Seminar zur Didaktik des Biologieunterrichts der Volksrepublik Polen, 18-21. Juni in Przemysl (A report on the IVth seminar on the didactics of biology in Poland, held on June 18th to 21st, 1979 in Przemysl)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 11, pp. 305-307.

The 4th Polish seminar on the didactics of biology was held on June 18th to 21st, 1979 in Przemysl. The basic topic of the seminar was:"Theoretical Foundations and Research Findings concerning the Verification and Assessment of Biology Teaching". The seminar was organized joinly by the section on the didactics of biology teaching of the Nicolaus Copernicus Natural Sciences Association and the section for school biology didactics of the Biological Society of the G.D.R. Large delegations of participants from the G.D.R., France, Czechoslovakia and the Federal Republic of Germany were present. The seminar was chaired by Dr. W. Stawiński, the chief of the Institute for the Didactics of Biology at the Pedagogical Institute in Krakow.

AA

KATTMANN, U.
Biologieunterricht in Asien II. (Biology teaching in Asia-II).
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No. 8, pp. 247-249.

An Asian conference on biology teaching called "Multidisciplinary Biology Education Relevant to Community Development" was held in Kuala Lumpor in Malasia from December 12th do 15th 1978. The conference discussed the aims and main espects of biology teaching in Asian schools, as well as problems of adult education and work with parents, relations between society and the environment, the gap which exists between biology teaching and the education of biology teachers, a new approach to the objectives and tasks of biology teaching and the integration of teaching in schools. The author partially compares the problems of biology existing in biology teaching in Asia with those existing in the Federal Republic.

AA

KAUDEWITZ, H.
16. Didactica in Brüssel 1978 (The 16th Didactica Exhibition in Brussels in 1978)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 2, pp. 51-52.

The 16th Didactica Exhibition in Brussels was held immediatly after the international exhibition "Interschule" in the Federal Republic. For this reason only enterprises with international scope participated. However, a number of firms from France, Great Britain and Benelux did participate. There was great interest in German products; two catalogues and many brochures were available. The largest hall was devoted to audio-visual media, phonographs, tape recorders and 16 mm projectors. A Singer Insta-load model and Elmo 16 CL-Xenon (a complete facility for image and sound) were new items. Fresnell lenses in a projector of a new type from a Japanese firm were of excellent quality. Also various types of microscopes were exhibited. BIOLAB has issued a handbook on microscopy which is of very good quality. The firm PHYWE exhibited models for teaching genetics. Hagemann exhibited wall pictures pertaining to human biology. Also new biology films were offered. Teachers today are more price conscious as far as teaching aids are concerned and more critical towards the didactical value of aids.

AA

KAUDEWITZ, H.
17. Didactica in Düsseldorf 1979 (The 17th Didacta exhibition in Düsseldorf in 1979)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 7, pp. 190-192.

The 17th Didacta exhibition in Düsseldorf marked the end of a lull in the development of teaching media. The trend towards exaggerated technization has been overcome, too expensive and too technical visual aids have all but disappeared. Media suitable for information processing, microcomputers and calculation machines can increasingly be seen. The prices of many media have declined, so that even pupils can buy them. For instance a good quality school microscope by E. Leitz is offered for only 795 DM. Also less costly colour televisions have appeared, as well as new slide projectors (Fanti 150 by the firm Liesegang), some projecters have new designs, projectors for cassette films are being offered, as well as micro-projectors. Also some overhead projectors have new designs with Fresnell lenses and new types of lamps.

AA

LITSCHE, G.

Reflexionen eines Beteiligten, ausgelöst durch den VIII. Pädagogischen Kongress (Some considerations of a participant in the VIIIth Pedagogical Congress)
Biologie in der Schule, 28, 1979, No. 4, pp. 129-134.

The author, who is the director of a school in Berlin, recollects his impressions of the VIIIth Pedagogical Congress. He discusses various problems which he encounters daily. He especially stresses orientation towards individual pupils and the advantages, but also the dangers of routine work by teachers.

FH

LORENZ, K. M.

Report on the First Annual Symposium of the Latin American Science Teachers Association
Science Education, 62, 1978, No. 2, pp. 249-256.

The author provides brief information on the first symposium organized by LASTA, which was held in 1976 in Sao Paulo in Brasil. Information is given on the organizers, participants and the organization of the symposium. Six papers were presented. The author also describes various aspects of science teaching in schools throughout Latin America. He concentrates, among others, on the problem of so-called integrated science courses, which were often discussed at the symposium. Another regional problem discussed by the author is the context and reasons for teaching the natural sciences in basic and secondary schools. In conclusion, general comments and summary conclusions on the deliberations of the symposium are offered.

RA

MIKOŁAJCZYK, W.
Narada w sprawie postępu pedagogicznego (A conference on the preparation of pedagogical procedures)
Biologia w szkole, 32, 1979, No. 4, pp. 181-182, 1 photo.

The Polish Ministry of Education organized a conference of the editors-in-chief of pedagogical journals. Problems concerning the unification of teaching procedures recommended in all pedagogical journals were stressed as important prerequisites for the introduction of the new system of education in Poland. The Ministry provided some suggestions to the editors of these journals for their further activities in education. The journals are expected to give priority to problems concerning innovations, the iniciative of teachers, and the use of the experiences of foremost teachers. At this ocassion the Minister of Education awarded the journal Biologia w szkole with a commemorative medal at its 30th anniversary.

AA

MIKOŁAJCZYK, W.
Zjazd polskiego towarzystwa entomologicznego (A conference of the Polish Entomological Society)
Biologia w szkole, 32, 1979, No. 2, p. 87 .

In September 1978 the 36th conference of the Polish Entomological Society met in Białowieska, in which 150 practical and theoretical entomologists from all of Poland participated. The program of the conference concerned problems of entomological research in national parks and protected reservations and entomology and the problems of nutrition and the needs of man. Guests from Czechoslovakia, the Soviet Union and the G.D.R. were present. The conference took two days; a total of 30 scientific communications and 12 papers were presented. The third day of the conference a special excursion was organized.

AA

MOREL-FOURRIER, J. C.
Congrés de L' A. P. B. G. Antilles-Guyane 1980
(The A. P. B. G. Congress in the Antillies - Guyana 1980)
Biologie, Géologie, 66, 1979, No. 3, pp. 343-360.
13 figs.

In July 1980 the Association of Professors of Biology and Geology is organizing a working Congress on the islands of Guadelupe, Martinique and Guyana. In the extensive program of the Congress the interesting mangrove vegetation of the coastal areas will be studied, as well as the beaches, the vegetation found on rocks, the dry and hydrophytic jungle and mountain vegetation up to an alttitude of 1000 m. Fauna will be studied in the coastal areas, as well as inland and in areas around fresh water lakes and streams. Special attention will be devoted to the mangrove type of vegetation and finally to animals dangerous to man, for instance those which are carriers of infections such as bilharziasis and elephantiasis.

LR

NAUNAPPER, L.

Aus der Arbeit der Fachkomission Leipzig-Südost
(On the work of a special commission in Leipzig)
Biologie in der Schule, 28, 1979, No. 10, pp. 435-436.

Annual school-leaving examinations provide an opportunity for assessing the work of both pupils and teachers. The special commission in which the author is a member has designed workoooks with assignment, their solutions and keys to answers, as well as instructions on how to proceed printed and uses them for examinations in the 8th and 10th classes. Pupils have expressed positive opinions of these workbooks.

FH

PETUSKHOV, V. M.

Slet trudovoy yunosti strany (A gathering of working youth of our motherland)
Biologiya v shkole, 53, 1979, No. 5, pp. 53-59.

This gathering was held in the city of Zaporozhets at the occasion of the 25th anniversary of the founding of pupils' work brigades. Several hundred of the best members of pupils' work brigades were invited, together with their leaders and teachers, as well as foremost heros of socialist labour. The article describes the course of the gathering at which several personages spoke of the significance of the work done by the brigades and the successes they have achieved. The second day of the conference was devoted to various competitions of pupils in various agricultural activities, an exhibition of the successes achieved by the brigades was openned and meetings with authors of various books took place. The third day of the gathering the participants became acquainted with the practical activities of the best pupils' brigades and summer labour camps. The final day of the gathering a scientific and practical conference of the organizors of pupils' competitions met. L. Brezhnev sent greetings to the conference, in which he stressed the importance of pupils' work brigades. In conclusion the victors of various competitions were announced and representatives of the delegates read a report of their activities which was then sent to the Central Committee of the Communist Party of the Soviet Union.

FH

PODSTOLSKA, M.
IV. seminarium dydaktyki biologii (The 4th seminar on the didactics of biology)
Biologia w szkole, 32, 1979, No. 5, pp. 228-229, 1 photo.

On the 18th to 21st of July 1978 the 4th All-Polish seminar on the didactics of biology was held in Przemysl. Of 200 participants, 38 came from foreign countries (the G.D.R., Czechoslovakia, Yugoslavia, the Federal Republic and France). The main topics of the seminar were the theoretical foundations and research findings of the process of verifying and assessing biology teaching; among the most important problems discussed were the permanency of the knowledge gained by the pupils, their skills in the area of biology, problems of verifying and assessing pupils' knowledge, problems of self-verification and self-assessment and a study of methods and means for assessments.

AA

PODSTOLSKA, M.
Udana impreza w międzynarodnowym roku dziecka
(A successful activity within the framework of the International Year of Children)
Biologia w szkole, 32, 1979, No. 4, pp. 184-186, 3 photos.

At the occasion of the 35th anniversary of the Peoples' Republic of Poland and the International Year of the Child, the municipal administration of the district of Strzelno convened a gathering of youth from schools in the district to which youth from some Warsaw schools were also invited. Part of the gathering was a meeting which assessed the outcome of school rounds of Biology Olympiads. Young people has worked a total of 839 440 hours, planted 207.5 hectars of forest with 193 870 trees.

AA

RÄUBER, A.
Veranstaltungen der Biologischen Gesellschaft der DDR - Sektion Schulbiologie (The activities of the school biology section of the Biological Society of the G.D.R.)
Biologie in der Schule, 28, 1979, No. 4, pp. 159-160.

The section for school biology of the biological Society of the G.D.R. is planning the following activities for the school year 1979-80: Evolution (from 9.7. to 12.7.1979) - led by dr. Freydank; Teaching biology at a zoo (from July 7th to 13th); Ecology and nature conservation (in July and August). The author also cites briefly the purpose of these activities and their relation to biology teaching.

PH

SCHAEFER, G.
5 Jahre VDB-Rahmenplan - Erfahrungen und neue Perspektiven (5 years of planning new syllabi by the Association of German Biologists - experiences and outlooks)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 7, pp. 192-193.

The Association of German Biologists in 1973 accepted a plan for drawing up syllabi for biology teaching for all types of schools. In December 1978 it published this report. At a meeting in Radevormwald on December 7th to 9th, 1978 the members of the Association, together with members of the staff of the Institute for the Pedagogics of the Natural Sciences from all the regions of the Federal Republic discussed the situation in the preparation of the new syllabi. Also the problem of equipping schools with correct media for teaching according to the new syllabi were discussed. Some types of schools are decreasing the number of hours devoted to biology. This work will continue.

AA

SLASTENINA, E. S.
V naučnom sovete po pedagogicheskim aspektam okhrany okruzhayushchey sredi (Discussions in the scientific council concerning pedagogical aspects of the conservation of the natural environment)
Biologiya v szkole, 53, 1979, No. 4, pp. 76-77.

On April 4th and 5th 1979 an All-Union Coordinating Conference was held in Moscow on the topic "Improving the content and method of teaching on the conservation of the environment in general education schools and pedagogical schools". The conference was organized by the National Council for Pedagogical

Aspects of Nature and Environment Conservation, attached to the department of didactics and special methodologies of the Academy of Pedagogical Sciences of the USSR, together with the Laboratory for Education Towards the Protection of the Natural Environment of the same institution. The author describes the content and most important passages of the main papers presented to the conference.

FH

SPIESS, H. J.

9. Generalversammlung der Biologischen Gesellschaft der DDR (The 9th General Assembly of the Biological Society of the G. D. R.)

Biologie in der Schule, 28, 1979, No. 2-3, pp. 217-219.

The 9th general assembly was held on October 20 - 22, 1978 in Neubrandenburg on the topic: "The Advances of Biology - The Requirements of Practice". 470 members participated. Seven papers were presented in the plenary session and twelve in two sections. The author describes the papers presented. A new presidium of the Biological Society, whose members are cited by the author, was elected.

FH

TROMMER, G.

Bericht über die Jahrestagung der Gesellschaft für Ökologie (GfÖ) von 25.9. bis 30.9.1978 in Münster/Westf. (Report on the annual meeting of the Ecological Society on September 25th do 30th 1978 in Münster/Wesphalia)

Naturwissenschaften im Unterricht. Zeitschrift für die Unterrichtspraxis der Sekundarstufe I - Biologie, 27, 1979, No. 1, p. 25.

This international scientific society of German speaking countries has exited for seven years and organizes a total of 850 members from various countries. The aim of the society is international scientific cooperation in the field of ecology. Scientific institutions devoted to various aspects of agriculture, forestry, food processing, veterinary medicine and environmental concervation cooperate with the society. In the Münster meeting, 200 members participated. Part of the program of the meeting was an excursion, an exhibition of ecological planning and the presentation of a number of papers. The main topic of the theoretical program was the concept and planning of ecology, teaching and education in schools in the spirit of the new concept of ecology ant the relation between the didactics of biology and ecology in schools.

AA

ZABEL, E. - HEINZEL, I.
Zur Verleihung des Ernst Haeckel-Schülerpreises 1979
(Awarding the E. Haeckel Prizes for 1979)
Biologie in der Schule, 28, 1979, No. 9, pp. 387-389.
1 fig.

The E. Haeckel Prize was awarded for the ninth time in 1979. The aim of this award is to support the scientific activities of young people in biology. A total of 106 entries was assessed; their quality is improving from one year to the next. The presidium of the Biological Society has also decided to found a new prize, named after the genetic biologist Erich Correns. The author provides a list of the best work submitted to the competition with brief descriptions.

FH

ZICHÁČEK, V.

Seminář k péči o životní prostředí (A seminar on environmental conservation)

Přírodní vědy ve škole, 30, 1978/79, No. 4, p. 134.

The study center for biology and geology at the Regional Pedagogical Institute at Olomouc organized on March 22. - 24.,1978 a regional seminar on environmental and nature conservation in biology and geology teaching in the schools of the North Moravian region. The seminar was hald in the town of Přerov. The introductory paper was presented by Comrade Sluštík. Among the other 17 papers presented, the most interesting were: Education Towards Environmental Conservation in Schools and the Function of Biology and Geology by D. Kvasničková. The Philosophical Aspects of Environmental Conservation by R. Roháček, Bird Conservation in the North Moravian Region by J. Sitko, Approaches to Environmental Conservation in Europe and Special Problems of Czechoslovakia in this Context by J. Čeřovský and others.

vč

ZUCCHI, H.

Jahrestreffen der hessischen Naturschutzjugend (Annual gathering of Hessian youth for environmental conservation)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 2, pp. 52-53.

On September 30th and October 1st 1978 a gathering of youth for environmental conservation met in Schiffenberg near Giessem. The organizers of the gathering were the German Association for Bird Conservation (DBV), German Forestry Youth (DWJ) and the Hessian Society for Ornithology and Nature Conservation (HOON). The aim of the gathering was the furthering of the cause of nature conservation in Hessen and providing a survey of what has been done in this area, as well as making contacts between organizations with similar purposes. 700 people narticipated. Papers were presented, as well as lectures on various topics, films were shown, an exhibition was organized and an excursion. In the evening a folklore celebration with singing took place.

AA

Zum Inhalt und Charakter der socialistischen Schule
(Concerning the content and characteristics of Socialist school)
Biologie in der Schule, 28, 1979, No. 2/3, pp. 49-50.

The article is a summary of a speech made by the Minister of Education of the G. D. R., M. Honecker at the VIIIth Pedagogical Congress. First she analyses the aims of education and teaching, which are based on Marx-Leninst theory. Contemporary schools are polytechnical. The first to combine teaching with practical training were schools in the Soviet Union. Contemporary schools are closely connected with life, with the practice of socialist construction. It provides all pupils with an extensive and scientifically founded general education in which theory is closely connected with practice.

PH

14.9 Prominent biology teachers, anniversaries, deaths

ABDRAKHMANOVA, S. S.
Selskiy uchitel (A village teacher)
Biologiya v shkole, 53, 1979, No. 1, pp. 51-52. 1 fig.

Nurzhakoy Shegirov was born in 1932. Since graduation from Pedagogical School he has been teaching in the village of Aktogoy, where only in the last five years he has educated over 500 pupils. All his lessons also touch upon the problems of life and agricultural practice. He always takes into account the regional approach and uses the experiences of the local Sovkhoz. He has achieved very good results in the vocational guidance of pupils. He is also the leader of a pupils' work brigade. Other schools in the region make use of his experiences.

FH

AVRAMOVA, E.
Kogato i srtseto gori (When also the heart is burning)
Biologiya i khimiya, 22, 1979, No. 5, pp. 45-46.
1 photo.

The article describes the life and work of the Bulgarian Teacher of Merit, Kiril Risov, who has also recieved the medal "Hero of Socialist Labour". He has always been an advocate of the idea that school should combine theory and practice, especially in such teaching subjects as biology. He founded a school experimental plot of land and a young nature scientists station. Above all, however, he loved children and it was for them that he wanted to introduce to school the best possible conditions for teaching.

LR

BOGOSAVLENSKAYA, A. B.
Antonina Aleksandrovna Suslova (A. A. Suslova)
Biologiya v shkole, 53, 1979, No. 5, p. 52, 1 fig.

A. A. Suslova has been teaching biology for 27 years. She devotes great care to a detailed preparation of teaching plans. From the very beginning of her teaching career she has been interested in teaching media and in making other materials for teaching available to her pupils; she makes or finds them together with her pupils. She has also devoted her attention to extracurricula activities - among others she founded a club called "The Young Atheist". She has recieved a number of awards for her activities.

PH

DIETRICH, C.
Emil Adolf Rossmässler - ein Wegbereiter des fortschrittlichen Biologieunterrichts (E. A. Rossmässler - a pioneer of progressive biology teaching)
Biologie in der Schule, 28, 1979, No. 12, pp. 518-528.

E. A. Rossmässler was born on March 3rd, 1806 in Leipzig, in 1825 he began to study theology at the University of Leipzig, but in two years he already was contributing to the training of pharmacists in botany. He collaborated with the famous botanist Reichenbach. In 1830 he became a professor at Tharandt, where he taught zoology and discovered a new specie of molluscs. He collaborated with A. von Humboldt, L. von Buch and baron von Jaquine. His most important scientific work is "Iconographie der Land- und Süsswassermollusken Europas". The author of the article also deals with the political activities of Rossmässler and his contribution to popular education. He describes in detail his contribution to the didactics of biology. In 1860 he wrote "The Teaching of the Natural Sciences - Comments and Suggestions on its Reorganisation". He wrote that teaching requires the use of natural objects and developed his own concept of teaching media (which included besides models, also pictures and "what the teacher carries in his heart and mind") and always stressed ostensiveness. He drew up a progressive concept of teaching the natural sciences, which was highly praised by Diesterweg. In conclusion of the article the author considers E. Rossmässler's heritage and cites a survey of his work between 1830 and 1866.

FH

Dobre wzorce (Good examples)
Biologia w szkole, 32, 1979, No. 3, pp. 136-137.

The biology supervisor in the town of Przemysl, Bronislav Kochmański, celebrated 30 years of pedagogical work, twenty years as biology supervisor and ten years in administrating basic and secondary schools. He has published extensively in the field of pedagogics and the didactics of biology. He also works in the history of the didactics of biology in Poland and has collaborated in the founding of - Polish museum on the didactics of biology.

AA

GRÖNKE, O.
Prof. Dr. h.C. Albert Pietsch - Lehrer und Wissenschaftler aus Berufung (Albert Pietsch - teacher and professional scientist)
Biologie in der Schule, 28, 1979, No. 9, pp. 354-357.
1 fig.

Prof. Pietsch was born on December 7th, 1889 and died June 24th, 1979. The country has lost in him an outstanding educator and nature conservationist, who was one of the pioneers of the didactics of biology in the G. D. R. In the period 1910-1929 he worked as a rural teacher and at the same time studied biology with foremost experts. He published over 30 scientific papers. His greatest interest was in nature conservation and he was active in this area (he was a member of the editorial boards of various journals and was a member of various societies in this area). He also published over 100 papers concerning the didactics of biology and became a professor of the didactics of biology at the first pedagogical institution of higher learning in the G. D. R. He was particularly interested in biological experiments and continued in the work of the well known biology didacticians - J. Diesterweg, Junge and Lay. He was a member of the editorial board of the journal Biologie in der Schule, a member of the presidium of the Biological Society of the G. D. R. and the chairman of its section on school biology.

PH

KUMMER, G.
Anni Kupke - Lehrerin aus Berufung (Anni Kupke - a professional teacher)
Biologie in der Schule, 28, 1979, No. 9, pp. 358. 1 fig.

Prof. A. Kupke was born on March 28th 1891 and died on June 23rd 1979. She attended the lectures of E. Haeckel with whom she studied biology (she also studied chemistry, mathematics and philosophy). In 1933 she was fired by the Nazis. After the war she participated in the drawing up of new syllabi and textbooks and in the further education of teachers. She was in charge of teaching at the Berlin Zoo.

Since its founding she was a member of the Biological Society of the G. D. R. , where she was active in the section for school biology. In 1961 she received the title Teacher of Merit and in 1964 she became a professor.

FH

MINKOV, T.

Nashiyat dlg (Our obligation)

Biologiya i khimiya, 22, 1979, No. 1, pp. 51-52.

The author remembers some outstanding Bulgarian teachers who in the war against Fascism participated in the struggle. He also comments on the obligations of contemporary teachers, especially those teaching biology and chemistry, who have every opportunity to prepare their pupils for the new tasks awaiting them in industry and agriculture in a developed socialist society.

LR

NIKISHOV, A. I. - SOKOLOV, A. N.

K yubileyu Anny Moiseyevny Tsuzmer (At the occasion of A. M. Tsuzmer's birthday)

Biologiya v shkole, 53, 1979, No. 2, p. 59, 1 fig.

In May 1979 A. M. Tsuzmer celebrated her seventieth birthday. She is a well known expert in the didactics of biology. She graduated from the Natural Science Faculty of Moscow University in 1938. In 1954 she was one of the co-authors of the book The Methodology of Teaching Human Anatomy and Physiology. Since 1955 she was the methodology expert of the biology study center at the Moscow Regional Institute for Furthering the Education of Teachers. She especially stresses the content of biology teaching and is the

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co-author of the biology textbook for the 8th class in which human anatomy, physiology and hygiene are taught.

FH

PODSTOLSKA, M.
Dobre wzorce (Good examples)
Biologia w szkole, 32, 1979, No. 4, pp. 182-186.

Josef Gilowski, senior school supervisor and expert in the methodology of biology and hygiene in Opole and also the coordinator of methodology experts of all general education teaching subjects, has been awarded an honourary medal. The article provides information on his life, work, his various activities as a school supervisor and how he contributed to the preparations of the teachers in the Opole region for the introduction of the new concept of biology and hygiene teaching in schools. He is also the author of a guide to the Opole region and has been active in studies of flora and fauna.

AA

ROZHKOV, A. D.
Tatyana Ivanovna Gutseva
Biologiya v shkole, 53, 1979, No. 3, p. 54. . fig.

T. I. Gutseva has been teaching biology for more than thirty years. Under her supervision pupils have been carrying out various experiments on an experimental plot of land (the stimulation of growth, a beet crop, etc.). She founded a "green" patrol. In 1974 she was awarded the title "Teacher of Merit" of the Belorussian Soviet Republic for her activities and in 1978 she was a delegate to the All-Union Congress of Teachers.

FH

15. Articles and information concerning scientific biology

DUNGER, W.
Grundlagen der Ökologie biologischer Produktivität (Produktionsbiologie) (The foundations of the ecology of biological productivity (production biology))
Biologie in der Schule, 28, 1979, No. 9, pp. 366-373, 2 figs.

The requirements of the world population for food are constantly increasing. One of the prerequisites for improving the present situation is knowledge of the transformation of organic substances, i.e. biological productivity. Production biology was founded in 1928 by Palmgren. The term production ecology is also used today in the same sense. The ecology of biological production deals with the utilization of solar energy in ecosystem for forming organic substances and the regulation mechanisms of these processes. The author deals with energy flows in the ecosystem, especially from the point of view of inner energy. From an energy point of view, life is the performing of work and the production of heat. In the transition between individual trophic levels in the ecosystem, energy is lost. The ecology of organic flows in the ecosystem is, however, still little known. The author also deals with the transformation of substances and energy in the ecosystem - especially from the point of view of production - and the control of this production. Increased production can be achieved by increasing the effektiveness of photosynthesis, decreasing the respiration of plants, shortening food chains, etc.

FH

HOELL, G.
Nahrungsmittelquelle Weltmeer (The seas of the world as source of nutrition)
Biologie in der Schule, 28, 1979, No. 12, pp. 536-538.

Seeking sources of nutrition has forced us to consider what the seas can provide in this context. The seas form 71 % of the surface of the planet, but so far have provided only 1 % of the food eaten and approximately 20 % of animal proteins eaten by humans. Fishing has become very extensive. While in 1900 approximately 4 million tons of fish were produced annually, in the seventies this figure was 65-70 million tons; since 1970 fishing has not increased any further. In 1975 this represented 17.6 kg of fish per capita throughout the world. About 30 % of all fishes caught are processed into fish meal, so that as an immediate source of nutrition only 12.6 kg per capita of fish are used. The largest amount of fish are consumed in Japan (60 kg per capita annually) and then in the USSR (16 kg per capita annually). In the G. D. R. this figure is only 7.6 kg. In 1976 approximately 19 000 ships served for fishing. In the number of fishing ships, first place belongs to the Soviet Union, followed by China, Peru and the USA. The largest number of fishes are caught in the Pacific ocean - approximately 44 %, in the Atlantic - 37 % and in the Indian ocean - 4.5 %. The author discusses the problem of whether the seas can produce more food. Approximately 150 000 species of fauna live in the seas, and of these only 16 000 are fish. To this 10 000 species of marine plants should be added. Of this abundance, only 1 500 species of flora and fauna are utilized. Thus there are reserves in this area. What is important, however, is controlling the reproduction cycle of plants and animals found in the sea.

FH

JACOBSEN, H.-P.

Bearbeitung von Saprobiensystemen (Dealing with saprobiotic systems)

Biologie in der Schule, 28, 1979, No. 6, pp. 256-265. 4 figs., 6 tabs.

The author continues in problems broached in earlier articles dealing with limnological objects, this time with the aim of describing specific communities which are typical for a given state of water and which characterize the content of organic matter in water. Such communities are called saprobiotic. The author first deals with the problem of making inland water eutrophic and cites the equation for calculating a saprobiotic index; with the aid of pictures he shows typical organisms.

PH

KARPINSKAYA, R. S.

Filosofskiye problemi sovremennoy biologii (Philosophical problems of contemporary biology)

Biologiya v shkole, 53, 1979, No. 5, pp. 7-14.

All problems in biology are related to philosophy. Especially the complex nature of biology is the main cause of the necessity of using a dialectical approach. Examples of the complex nature of biological cognition are the study of the origins of life, defining the place of biology in the system of sciences and the problem of man as a biological and social unity. The author discusses the concept of ecology and describes human genetics and genetic engineering. She then goes on to describe modern molecular biology, to criticise the work of J. Monod and to discuss the problem of comprehensiveness; this approach towards the study of man is a synthesis of pedagogical, medical, psychological and genetic knowledge concerning man.

PH

LITINSKAYA, L. L.
Kalichestvenniye metody v sovremennoy mikroskopii
(Quantitative methods in contemporary microscopy)
Biologiya v shkole, 53, 1979, No. 4, pp. 15-22, 4 figs.

Until recently, cytology was only a descriptive science. However, during the last 15 to 20 years, due to new technologies, quantitative microscopy is predominant; its essence is the transformation of basic, characteristic data on cells into numerical expressions. This data is morphometric (length, area and shape) and cytochemical (weight, DNA and RNA content, amount of protein, speed of synthesis, etc.). An interpretation of this data is then carried out by computer. The author describes the determination of morphometrical (geometrical) data on the cell with the aid of scanning optical microscope. The essence of the method id described and its use. She then deals with determining the catochemical characteristic of a cell. The interaction between light and weight is made use of in cytospectrophotometry, cytointerferometry, cytofluorometry, electron microscope cytochemistry and radio autography; each of these techniques is described in detail. In conclusion the author describes the uses to which quantitative methods of microscopy are put.

FH

MARKOV, M.
Biofizika - predmet i zadachi (Bio-physics - its subject and tasks)
Biologiya i khimiya, 22, 1979, No. 4, pp. 1-6.
1 diagram.

The XXth century is characterized by the stormy development of basic research in the natural sciences - in physics, chemistry, mathematics and biology. Most recently these sciences have been penetrating one another and new scientific disciplines are being formed, such as bio-chemistry, bio-physics, bionics, etc. Bio-physics is one of the strategically important sciences, which is closely connected with other scientific studies, such as for instance medicine and agriculture. It is a science whose objects of study are living organisms. However, physical methods are used to study these organisms and findings are expressed in the laconic language of mathematics. The author cites especially the following tasks of bio-physics:

1) To analyse the mechanism of the input, transmission and migration of energy;

2) to examine the role of sub-cellular structures in various biological processes,

3) to study nature from the point of view of its tensions and the autoregulatory processes existing in living systems.

LR

MĘZYKOWSKI, T.
Życie w Antarktyce (Life in Antarctica)
Biologia w szkole, 32, 1979, No. 4, pp. 148-156.
8 photos.

In December 1976 the ships Dalmor and Zabrze sailed from the port of Gdansk carrying a Polish scientific expedition to the Antarctic. At King George Island the expedition built a scientific research station of the Polish Academy of Sciences named after Henryk Arctowski. Expeditions to the Antarctic have a scientific, economic and political purpose. The subject of study is nature in the Antarctic, its flora and fauna, mineral resources, geology and climate. At present also aspects of nature conservation are important. The article describes the conditions in which the expedition works, the soil and environment of this region, the development of abiotic conditions, individual regions of Antarctica and the microbiology of the soil there. From an ecological point of view the author deals in greater detail with fresh water ecosystems in Antarctica. More then 200 species of water algea were found to exist here and of this number more then 50 % were endemic to the region; a total of 360 species of algae and 400 species of lichen, as well as 72 species of moss were also found. There are very few liver leafs and fungi in Antarctica and only two species of blooming plants: Colobanthus quitensis and Deschampsia antarctica. The dominating group of animals are arthropoda, which can be found as far as the 84° southern latitude. Of the arthropoda, the most frequently found are mites, insects, freshwater crustaceans and bear animalcules. Arthropoda can be found in two ecosystems: in moist soils and fresh water pools (chalicosystems) formed by the remnants of disintegrated rocks, without macro-vegetation (to an upper boundry of 2000 m and 77° southern latitude) and in bryological systems which are made up of moss, lichens and less frequently also algae (with an upper boundry of 1300 m and 74° southern latitude). These are two theories to explain the origins of living organisms in Antarctica: the reliot and immigrant. A number of endemic species of flora and fauna were found. At present Antarctica is protected by international agreements from the 60° southern latitude further south. The landscape, as well as all living organisms, are protected according to these international agreements.

AA

SCHELER, W.

Zu einigen Aufgaben der biowissenschaftlichen Forschung in der DDR in nächsten Jahrzehnt (Concerning some of the tasks of biological research in the G. D. R. in the next decade)

Biologie in der Schule, 28, 1979, No. 10, pp. 422-426.

The author first discusses general aspects of the program of development of biological sciences, such as the reasons for developing those biological sciences which touch upon various areas of the life of society (medicine and agriculture) and which include the molecular level of biological structures, up to ecosystems. The division of labour among the socialist countries is of great importance in this context. In conclusion the author discusses the aims of biological sciences (control of life processes, optimalization of the interaction between biological and social mechanisms in the development of man, the transfere of biological principles into technical development) and characterizes in greater detail 14 main research tasks.

FH

15.1 Botany

AKSENOVA, N. A.

Tis (The yew tree)

Biologiya v shkole, 53, 1979, No. 1, pp. 79-80.

The yew tree (the order Taxales) has five genra which belong to the Taxaceas family of the Taxopsida class. Yew trees are among the oldest plants. The genus Taxus includes eight species, which are found only in the Norther Hemispere. In the USSR only the

Taxus baccata and the Japanese yew tree (Taxus cuspidata) are found. Taxus baccata grows up to altitudes of 1 500 m, while the Japanese yew only up to altitudes of 100 to 900 m. The yew tree is dioecious. Its seed is covered by a pulpy epimatium. The yew tree grows very slowly, its annual growth is two to three cm. It lives to an age of up to 4 000 years.

FH

ALICHANYAN, S. I.
Selektsiya promishlennikh mikroorganizmov (The breeding of industrial micro-organisms)
Biologiya v shkole, 52, 1979, No. 1, pp. 15-20, 2 figs.

Microorganisms are capable of synthesizing complex substances needed for the life of a cell out of simple compounds. Some micro-organisms are capable of synthesizing larger quantities of these substances than they themselves require, and this forms the basis of their industrial utilization, especially in those cases when such substances cannot be made artificially or only at greater costs. Not only natural strains are used for this purpose, but also those which have been cultivated for a special purpose. The basic method of cultivation of micro-organisms are artificial, mutants, selecting a bio-chemical mutant and hybridization. The foundation for the forming of an artificial mutant is a change in the gene by chemical or physical means. Biochemical mutants are selected in a cultivation medium with the aim of achieving mutation. Hybridization is also used and is connected with the discovery of parasexual processes. Especially the order Actinomycetel is used, where the outcome of the cross-breeding has not only the qualities of the initial forms but frequently new forms which are the outcome recombinant processes. The development of such forms assumes genetic engineering.

FH

BAUMANN, K.
Bioindikatorfunktion einer alten Pflanzensammlung
(An old collection of pressed flora and the function of an bio-indicator)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 9, pp. 249-250.

Old herbariums can be scientifically very valuable. They contain samples of plants which can bring testimony of the situation existing in a number biological areas. The author provides information on two old collections of pressed flora. One is from 1556 - the herbarium of the Naumburg physician and botanist Casper Rathenberger and the second, which contains mostly woody species, belonged to Carl Schildbach in 1799. Both collections make it possible to carry out cytological and chemical analyses and represent material for a study of the environment at the time of their collection. The herbarium of woody species contains 546 items, the covers of its individual volumes are made of the outer layer of bark with lichens, fungi and moss, while the boxes contain samples of wood and the fruit of the trees, as well as pressed blooms, etc. The lichens make it possible to use the specimens as bioindicators of the environment of the time.

AA

BUKATSCH, F.

Die Gärungen der Mikroorganismen (Kohlhydrate als Energiequelle I. (The fermentation of micro-organisms (carbohydrates as an energy source I.))
Naturwissenschaften im Unterricht. Zeitschrift für die Unterrichtspraxis der Sekundarstufe I, 27, 1979, No. 2, pp. 33-37, 2 figs.

Micro-organisms can obtain energy by the fission of saccharides by various ways. The most important of these are fermentation and respiration. Fermentation takes place as an anaerobic process, i.e. it takes place without free oxygen. Fermentation can have various forms. The most important of them are alcohol fermentation, lactic fermentation and the fermentation of butyric acid. The article describes all three kinds of fermentation. The experimental focus of the article is alcohol fermentation (with ethanol) and lactic fermentation, which are both of great practical importance in industry. The aneorobic fission of glucose by glycosis provides less free energy in relation to the quantity of glucose. The following equation reflects the process:

$$(C_6H_{10}O_5)n + (n-1)\ H_2O \longrightarrow n(C_6H_{12}O_6)$$

polysaccharide (for instance starch)	water	monosaccharide (for instance grape sugar)

From a mathematical point of view the equation does not seem correct, but given the large numerical value of "n", the value of "n-1" can practically be overlooked.

$$(C_6H_{12}O_6) \xrightarrow{\qquad\qquad\qquad} 2\ C_2H_5OH + CO_2$$

a sugar solution or fruit juice	fermentation yeast - zymase	ethylalcohol	carbon dioxide

AA

CORNIER, P.
Quelques plantes d'une combe à neige (Some plants found in snowy dales)
Biologie, Géologie, *66*, 1979, No. 3, pp. 409-417, 4 figs.

The author selects five inconspicuous plants which bloom under the spring snow and which the botanist can find as the author describes, when "walking on all fours": Cerastium cerastiodes, Salix herbacea, Sibbaldia procumbens, Omalotheca supina and Alchemilla pentaphyllea. He provides their botanical characteristics, special aspects and their medicinal value, as well as their propagation and use. The article is accompanied by colour photographs.

LR

DUMAS, C.
Donnes récentes de la biologie florale - la fertilisation (New information on floral biology - fertilization)
Biologie, Géologie, *66*, 1979, No. 2, pp. 249-281. 14 figs.

An extensive article with information based on the latest findings concerning fertilization in plant biology. Original micro-photographs clarify the function of pollen and open new perspectives in research in this field. A very instructive article for all biology teachers.

LR

ELIÁŠ, P.

Ruderální společenstva a ich miesto v životnom prostredí člověka (Ruderal communities and their place in the human environment)
Přírodní vědy ve škole, 30, 1978/79, No. 3, pp. 85-87.
1 fig.

Ruderal communities are secondary plant communities of the synantropis group, where man forms the conditions of their existance. They are thus found in the immediate vicinity of human dwellings and form an indivisible part of man's environment. Ruderal communities have not only an ecological function (a biological one), but also a social function - for instance as indicators, they serve the purpose of decontamination, re-cultivation and also they have an aesthetical function and they are a natural resource. These communities serve very well and reliably as indicators of the ecological conditions of a site. They may indicate pollution of the environment, especially by organic waste and by chemicals. Their hygienic or decontamination function is that they contribute to an improvement of the environment by providing green areas with their specific bio-climate, filtration and anti-noise functions. They also contribute to the recultivation of pit heaps and the greening of ruderal and fill-in soil, thus improving the aesthetical quality of the environment. Ruderal communities are also a natural source of medicinal plants and those which are used by the pharmacological industry.

VČ

ERDTMANN, J.

Über einige neuere Ergebnisse zur Ammonium-Asimilation bei Pflanzen (On some new findings concerning the assimilation of ammonium by plants)

Biologie in der Schule, 28, 1979, No. 6, p. 266.

The main way in which nitrogen is assimilated is by reductive assimilation (keto-glutaric acid reacts with NH_3 and $NADH_2$ to form glutamic acid, NAD and water), with the participation of the enzyme glutamate dehydrogenase. Besides the forming of reductive amines, also the development of glutamine from glutamic acid and ammonium, which is catalysed by the enzym glutamine synthetase, is typical for autotrophic plants. Glutamine is a transport form and store of nitrogen in the plant. Many amino acids are also developed by the forming of transamines. A study of primary production has, however, indicated that first glutamine is produced, then glutamic acid and this has led to the seeking of an enzyme which would make possible the reaction glutamine + 2 - osoglutarate + NADH into glutamic acid. The enzyme which acts as a catalyst to this reaction is called glutamine-2-oxoglutarate-aminotraferase, or GOGAT for short.

FH

GLAZUNOVA, K. P.

Gorechavka zheltaya (Yellow gentian)

Biologiya v shkole, 53, 1979, No. 4, pp. 79-80.

The genus Gentiana includes more than 400 species. The majority are not too high and very durable grass. The largest specie is the yellow gentian, which is 1.5 m high. In the USSR it is a protected plant, which grows on meadows high in the mountains and on peat soils. Vegetative propagation is difficult and yields poor results. The author also describes the main morphological characterstics of this plant. The genus Gentiana has a high glycoside content and for this reason since the time of Avicena it has been used as a medicinal herb.

FH

LEISTNER, H. U.

Die pflanzliche Sekundärstoffe (Secondary plant substances)

Biologie in der Schule, 28, 1979, No. 11, pp. 483-491. 5 figs., 4 tabs.

Secondary substances are chemical compounds which are not found in all plants and therefore have a specific biological importance only for some species. They develop on the basis of secondary metabolism, which is connected with the primary (basic) metabolism. A characteristic trait of the primary metabolism is that the chains of reactions and their cycles are, in principle, the same in all organisms. Secondary substances are the basic elements of shape, colour, smell and taste. They are especially important in pharmacology. They are typically precipitated by the metabolism process. The author then deals with secondary substances in higher plants - alkaloids and with those of micro-organisms - antibiotics and toxins. In the second part of the article he considers proving the presence of secondary substances such as carotenoids, anthocyanins and antibiotics.

FH

MEDVE, R. J.

Mycorrhiza: A Common Form of Mutualism

The American Biology Teacher, 40, 1978, No. 6,
pp. 414-418, 3 figs.

A mycorrhiza is a structure formed by the mutualist co-existence of a plant root and a fungi. The article provides a survey of two forms of mycorrhiza: endo- and ectomycorrhiza which are both illustrated on the basis of examples, accompanied by photographs. The author discusses factors which influence the structure and composition of the mycorrhiza, such as light, the nutrition provided by the soil and its carbohydrate content. Special attention is devoted to the usefulness of mycorrhiza. In this form of co-existence the fungi has the opportunity to utilize the carbohydrates found in the roots. Some of the research done in this area is described. It has for instance been found that the mycorrhiza protects the plant against some pathogenes and that the fungi provide the plant with some organic substances and minerals, etc. The author also describes the possibilities of applied research in this field. In the final part of the article he considers some problems connected with mycorrhiza, for instance whether such plants should be considered as heterotrophic and why some plants follow a succession based in the presence of a specific fungal flora, etc.

RA

PETROVA, I. P.

Ryabina (The mountain ash)

Biologiya v shkole, 53, 1979, No. 5, pp. 78-79.

The author first describes this tree, which has been well known to mankind since time immemorial and also its geographical distribution. In the USSR there are 28 species of the mountain ash and two of them are listed in the "Red Book" of protected plants (the Ayastan and Turkestan ash trees). Some specie of ash are highly valued as decorative plants. Botanical gardens have mountain ash trees with white fruit. Since the end of the XIXth century the mountain ash has been cultivated and various hybrids have been produced among others by Michurin. The mountain ash is very resistent to frost, its fruits contian large amounts of vitamin C and it has medicinal properties; its seeds contain oil.

FH

ROST, T. L. - SANDLER, M. L.
The Common History and Popular Uses of Roots
The American Biology Teacher, 40, 1978, No. 6,
pp. 338-341, 1 tab.

In the introduction the authors provide a survey of the uses of roots throughout history - in connection with various religions and magic, as sources of food, medicinal substances or as raw materials for manufacture. The roots of the ginseng are described, as well as the mandrake, peonies, cassava, sweet potatoes, yems, yucca ant other plants. In a table attached to the article the authors list 25 species of the most well known plants whose roots are used by men. For each plant the Latin and common name is cited, the area in which the plant is utilized, methods of application and other interesting facts.

RA

SCHARF, K.-H.

Isolierung und Charakterisierung von Pyrethrinen aus Blüten von Chrysanthemum cineraefolium und aus Insekten-sprays. (The isolation and characteristics of pyrethrine from the blooms of Chrysanthemum cineraefolium and from anti-insect sprays)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 12, pp. 309-315, 7 figs.

For every person living on earth there are about 300 million individual insects. In modern times chlorated carbohydrates (especially DDT) have been used against insect pests and those insects that transmit disease, but these substance usually have a negative effect on the environment. For this reason scientists are seeking insecticides which do not have secondary effects. These include for instance pyrethrine, which can be found in the flower Chrysanthemum cineraefolium, whose effect on insects has been known since 1840. Between 1910 and 1916 Pyrethrine I and II were isolated from this plant, at present other substance have been described: Cinerine I and II, Jasmoline I and II. Pyrethrine is more effective than DDT and is harmless to mammals. Its main problem is its easy phototoxidity and thus loss of its insecticid effect. Pyrethrine is stabilized by bonding to biological structures. In one bloom there are 2 - 4 mg pyrethrine (1-2 % dry matter). From pyrethrine it is possible to produce decamethine which has good stability and is 1 700 times more effective, biopermethrine which is 100 more effective and bioresmethrine which is even more stable and is 50x more effective. If we mix a pyrethrine extract with sesame oil, its effectiveness increases (this phenomenon is called synergism). Components of the oil called sesamine and sesaminolin increase the effect of pyrethrine, without themselves having any insecticidic effect. The author describes the method of extracting pyrethrine from the inflorescence of the flower and also some experiments with the insecticidic effect of the extract.

AA

SCHLEGEL, H.
Isolierte pflanzliche Protoplasten in der Forschung und für die Praxis (Isolated plant protoplasts in research and for practical purpose)
Biologie in der Schule, 28, 1979, No. 11, pp. 492-493.

By an isolated protoplast the author means a cell without its cellular wall which is thus enclosed only with a plasma lemma. The isolation of protoplasts by the enzymatic breaking down of the cellular wall was first described in 1960. The author here describes how to obtain protoplasts from plant tissue. Isolated protoplasts have a tendency to fuse together; they are able to accept macro-molecules, chloroplasts, viruses, nuceli and bacteria. They can be used for clarifying metabolic processes and for genetic studies. The development of protoplasts inside the cell begins with the forming of a new cellular wall, the development of undifferentiated tissue, then parts of the root, plant axis and later growth of the plant as a whole.

PH

TESAŘÍK, B.

Kaly z rafinérie ropy jako hnojiva (Sludge from petroleum refineries as a fertilizer)

Přírodní vědy ve škole, 30, 1978/79, No. 6, p. 210.

In Canada the possibilities are being investigated for using waste sludge from petroleum refineries for fertilization. The sludge contains heavy carbohydrates, sulphur compounds, metals and their compounds, as well as water. On experimental plots of land various quantities of this sludge have been ploughed into the soil in a range of 5 to 100 tons per acre (i.e. 12.3 - 247 tons per hectar). The soil was thoroughly cultivated to assure a sufficient quantity of air, warmth and light for woil bacteria. Then barley was planted. The crop was 18 - 31 % higher than on nontreated soils in the same climate area. The exception was a experimental plot of land with the highest quantity of sludge - 100 tons per acre, where the crop was approximately by one fourth lower.

VČ

TOBĚRNÁ, V.

Ruderální rostliny kolem nás (Ruderal plants in our environment)

Přírodní vědy ve škole, 30, 1978/79, No. 8, p. 290, 5 photos.

We designate as ruderal all species of plants which are found on garbage piles, pit heaps, in ditches and plants in the vicinity of human settlements. Their incidence is connected with changes in the soil, which are the outcome of environmental pollution. Ruderal plants are of importance, because on bare areas, such as heaps and fillings, they form dense and high foliage which covers an uneven and often ugly surface. Some ruderal plants have medicinal qualities, such as German camomille, yellow sweet clover, dead nettle, the tansy, wormwood and others.

VČ

UIBRIG, H.

Über die Waldformation der Mangrove (On mangrove type forests)

Biologie in der Schule, 28, 1979, No. 12, pp. 529-536. 10 figs.

Mangroves are an edaphic forest form. The term is derived from the word "mangle" which means "forest" in Spanish or from the Malay word "manggimanggi" combined with the English word grow. The author first describes where mangroves are found and that they cover over 2.5 million hectars of land. No specie specification has been made, but approximately eight plant families form mangroves. They are formed by woody species (Rhizophora, Avicennia, Sonneratia, Ceriops, Xylocarpus) and by ferns. They live in saline waters on the seacoast or in brackish water. They are halophytes and many have the characteristics of succulent plants. Typical are supporting and respiratory adventitious roots and propagation by viviparity. The author describes their biotope in greater detail, as well as natural succession, which can be divided into four parts. Also the economic importance of mangroves as forests is stressed.

FH

USPENSKAYA, M. S.
Piony (Peonies)
Biologiya v shkole, 53, 1979, No. 3, pp. 77-78. 1 fig.

Their beauty has won peonies a place in gardens and parks throughout the world. Their large blooms have up to 12 cm in diameter and they bloom in many shades, from pure white up to a very dark red. More than 30 species of the genus Peonia grow in Southeast Asia, the Mediterranean area, Crimea and the Caucasus. The most widely spread is P. anomala L. They are now considered to be an independent family - Paeoniae. Their gynoecium is apocarpous, the bloom is symmetrical, there are a large number of stamen. In the USSR peonies are protected.

FH

15.2. Zoology

BITTNER, C.
Zur Biokommunikation bei Vögeln (On bio-communication among birds)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 6, pp. 160-163.

The author describes the bio-communication taking place among birds. He devotes attention to parrots, corvidae and starlings, who are capable of learning to pronounce individual words, sometime even whole sentences. This is possible due to close contacts with a person who trains the bird. Usually these birds are successfully taught to speak only when they are kept individually by a person who substitutes for the bird's mate (these birds all live in pairs); between the person and the bird bio-communication develops for the purpose of maintaining the "pair". However, the sound expressions of these birds are usually inadequate to the situation and they really do not know what they are saying. In some birds, however, special signal situations arise, which for the layman are the source of surprising "dialogues". The ability of parrots, corvidae and starlings differs from the sounds produced by so-called imitators (for instance the Ictarina warbler and others). Some birds (the bullfinch, canary and chaffinch) when kept in isolation from their early youth and when exposed to the singing of other bird species, will learn to sing as these birds do.

AA

FLINT, V. E.
Rozovaya chayka (Ross's gull)
Biologiya v shkole, 53, 1979, No. 1, pp. 77-78.

Ross's gull (Rhodostethia rosea) has been known since 1824, but only 80 years later were ornithologists successful in determining where this bird nests (in the tundra in the vicinity of the lower part of the Kolyma river). At present the site of the bird's nesting area is known quite precisely. It includes the tundra and forest tundra between the rivers Yena and Kolyma. 6 to 12 pairs nest in a single colony and each pair always comes back to the same nesting site. The nests are usually 15 to 20 meters apart and the eggs are layed in the first 10 days of June. The chicks hatch in approximately 22 days.

The gulls eat aquatic invertebrates. Their total number is estimated at 50 to 80 thousand. In the USSR they are protected.

FH

HAGENMAIER, H. E. - GASS, F.

Die Immunoelektrophorese als Methode der Verwandtschaftsanalyse (Immuno-electrophoresis as a method of determining the relatedness of animal species) Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, No. 10, pp. 259-262.

The relatedness of animal species can be dealt with either in the classical manner, on the basis of morphological and anatomical studies and homology, or on the basis of modern serological studies. The authors describe the latter method, on the basis of the example of determining the relatedness of rodents and rabbits. Serological studies are based on the specific characteristics of the proteins found in the tissue of every animal. The authors describe the use of electrophoresis for providing serological proof of the existence of a relationship between a laboratory domestic mouse, a field mouse, a brown rat, a common hamster, a guinea pig and a domestic rabbit. The findings of the serological study indicate the relatedness of the laboratory domestic mouse, the field mouse, the brown rat and the hamster (Muroidea), the very close relatedness of the laboratory domestic mouse, the field mouse and the brown rat, the distinctiveness of the hamster and the very low degree of relatedness of these species with the guinea pig, as well as the marked distinctiveness of the domestic rabbit, which is a leporidae, not a rodent.

AA

HORNÍK, F.
Biologické metody boje se škodlivými druhy hmyzu
(Biological methods of combating insect pests)
Přírodní vědy ve škole, 10, 1978/79, No. 7, p. 242.

Biological methods of combating insect pests can be divided into two basic methods: 1) biological combating as such, which includes the use of entomophages, microbiological methods, genetic methods and the use of hormones, attractors and repellents, and 2) the stimulation of protective mechanisms of plants themselves. Birds, mammals, amphibians, and predatory or parasitic arthropoda can be used as entomophages. Their artificial breeding and then letting them out in areas with extensive pests has brought promising results.

Micro-biological methods use entomo-pathogenic microorganisms against insect pests. Often so-called bio-preparates are used, which are obtained from micro-organisms (enterobacterine, dendrobacilline); they are effective only if they enter the digestive tract of the pest.

The essence of genetic methods of combating insect pests is the activity of some external agent, for instance gamma-rays, x-rays or chemical sterilizing agents, upon the genetic and reproduction system of the pest.

In the use of hormones, greates success has been achieved with the use of insectostatic substances which surpress the growth, development and reproduction of insects. As an example, the use of juvenile hormons is cited. Also the use of pheromones is important; these are chemical substances which are necessary for communication among insects and include for instance sexual attractors, which are usually excreted by non-fertilized females who are luring males. This can be used in pheronome glue traps. For the future, various combinations of individual methods will become important.

VČ

IRSCH, W.
Pheromone beim Schwein (Pheromones in pigs)
Naturwissenschaften im Unterricht - Biologie, 27, 1979, No. 12, pp. 382-383.

Communication media within a specie in seeking a mate include sexual luring agents and bio-chemical signalization substances called pheromones. Among the higher animals pheromones are used for marking as scent posts. Also the domestic pig uses pheromone during copulation. The hog excretes this substance upon the swine in the form of foam saliva. The pheromone causes the swine to be compatible with the hog during copulation. It is formed in the testes of the hog and brought to its saliva through the bloodstream. The chemical structure of pheromone has been indentified and chemists are able to produce the hormone artificially. Pig pheromone can be used in animal breeding for artificial insemination. In man, a similar pheromone has been found in prespiration in the armpit. Its structural formula is not yet precisely known.

AA

YAZAN, Y. P.
Bobr (The beaver)
Biologiya v shkole, 53, 1979, No. 3, pp. 78-80. 1 fig.

Two specie of beavers live wildly - the Canadian beaver and the European beaver. Beavers grow to lengths of 1 m and a weight of 32 kg. They live near water and are herbivorous. In the course of several hours they are capable of gnawing through a tree with a diameter of 20-30 cm. These animals live in families: a male, female and one to three offsprings. In four to six weeks they are able to build a dam across a five-meter wide river and thus to raise the water level by 70 - 80 cm. They fiercly defend their territory. In the USSR they are protected.

FH

JENKINS, R. R.
Skeletal Muscles as a Peripheral Modifier of Behaviour
The American Biology Teacher, 40, 1978, No. 6, pp. 358-361.
3 figs.

The article deals with the problem of contraction of skeletal muscle fibre. The author demonstrates the fact that fibres do not always react according to the law of "all or nothing at all" (that is, in this case, maximum contraction or extension), but rather that its reaction can be graduated. First a historical survey is provided on the significance of the contraction of nerve fibres. There are brief descriptions of the opinions and experiments done by Huxley, Hurthly, Ramsey, and Street, Hoyle, Gonzales - Serratosa, Carlson and Wilkie, Sandow, Aidley, Bagust and Namba. Then various types of muscle fibre are described in detail. The author also discusses behavioural limits on the basis of the muscles variability. Examples are cited concerning the specie Ccypode and Cenobitus.

RA

KONOPKA, H. P.
Zur Lesrichtung von Stammreihen (Concerning the determination of the direction of development in phylum series)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 11, pp. 297-298.
1 fig.

The author discusses the development trends of individual phyla of animals. On the basis of the example of chordata and semichordata he demonstrates the importance of the problem and the scientific methods used to deal with the problem of the direction of development. The majority of zoologists consider semichordata as the initial phylum for the development of chordata. However, modern methods have indicated that the structure of semichordata should be derived from chordata and not vice versa. This would invalidate the claim that chordata developed from semichordata and semichordata would be seen as the outcome of regressive development, away from chordata.

AA

KONSTANTINOV, V. M. - SHATALOVA, S. P.
Ptitsi. Proiskhozhdeniye, filogeniya, charti prograssivnoy evolutsii (Birds. Their origins, phylogeny and progressive evolutionary characteristics)
Biologiya v shkole, 53, 1979, No. 6, pp. 8-13. 4 figs.

The class Aves includes more than 8 500 species. Their development began in the Jurassic period. The authors describe the structure of Archaeopteryx, which, however, represents a side line of development. Existing birds have some common traits with reptiles (skin derivates, the structure of the cranium, stomach, air sacs, kidneys), but they also have progressive evolutionary traits (the ability to fly, development of the nervous system, homoiothermy, care of offsprings). The authors analyse these progressive traits from an evolutionary point of view. For instance the heart of birds forms 0.8 - 2.4 % of the weight of their bodies, with a heartbeat frequency of 140 - 160 and in flight up to 1000 per minute; the weight of a bird's blood is approximately 1/20 to 1/10 of the weight of their bodies. A specific trait is the structure of their respiratory system, which is formed both by lungs and air sacs, whose functioning the authors describe in detail. The respiration frequency of birds is 30 - 600 per minute.

FH

OGNEV, V. A.
Zubr (The European zubr or bison)
Biologiya v shkole, 53, 1979, No. 5, pp. 79-80.

The specie Bison bonasus is described in detail, as well as its incidence, the length and manner of its life, its feeding habits during the day and in the course of the year. The penetration of man into areas where the bison lived, the felling of forests and hunting have caused the bison to sharply decline in numbers. After World War I bisons were found only in zoological gardens. Game keepers have been successful in breeding them, increasing their numbers and allowing them to live wildly again - but this concerns only the Belovezh zubr and cross breeds of the Caucasian zubr of which only one bull had been saved. The bison is also listed in the "Red Book" of protected animals.

FH

RIOUX, J. A. - COMBES, P.
Ecologie de quelques vers parasites (The ecology of several parasites)
Biologie, Géologie, 66, 1979, No. 3, pp. 393-398.

Prof. Rioux describes ecological analyses of epidemiological systems on the basis of the example of intestine or American Bilharziasis (Schistosoma mansoni). The article is a systematic study of a parasite whose host, place of incidence and methods used in its study are described. The author deals in detail with the density of cercaria in water, the function of the host and finally with the manner in which humans are afflicted.

LR

ZHIRNOV, L. V.
Dzheryan (The Persian gazelle)
Biologiya v shkole, 53, 1979, No. 4, pp. 78-79.

The Persian gazelle (Gazella subgutturosa) lives in Central Asia and in Kazakhstan. Its body is 95 - 115 cm long, its hight 60-75 cm, its weight 33 kg. The females are smaller than the males and do not have horns. They become sexually mature at 7 to 8 months of age, males in their 18th to 19th month. In their feeding habits, these gazelles have adjusted to the environment in which they live. In the USSR they are protected animals.

FH

ZHIRNOV, L. V.
Vintorogiy kozel (The markhor)
Biologiya v shkole, 53, 1979, No. 6, pp. 73-74.

The body length of males is 115 - 170 cm, their croup hight is 80 - 100 cm, weight 86 - 109 kg (females only 32 - 41 kg). On its head the markhor has horns twisted into a spiral. In the USSR these goats live in the mountains of the Northern Amudarya and Pyandzhe, outside the USSR in Afganistan, Pakistan and India. They live in groups of 10 - 12 animals. Pregnancy lasts 153 - 170 days, the female has a litter of one or two kids. The specie is listed in the book of threatened animals in the USSR.

FH

15.3 Human biology

ALDRICH, D.
Feeding a Hungry World
The American Biology Teacher, 40, 1978, No. 6,
pp. 342-345, 370.

The article concerns the very current topic of food resources for the increasing world population. In the introduction the author characterizes three opinions concerning this problem: 1. At present the limits of food production have already been reached. 2. At the beginning of the seventies such a food economy has developed which will lead to increasing prices of food. 3. The critical stage will be overcome. The author stresses the third point of view and analyses in the article some of the factors which influence equilibrium between the population, affluence and food. Special attention is devoted to the problem of agriculture and some of its aspects, such as water sources, basic element (nitrogen, potassium and phosphorus), plant disease, insect pests, energy consumption in agriculture and technologies which save energy. The author also deals with factors which influence food resources and factors which might improve the existing situation (slowing down population growth, plant disease prevention, increasing stocks and extending the flora and fauna which serve as food, increases in agricultural productivity, the forming of international food storage facilities, etc.).

RA

JELÍNEK, F.
Racionalizace výživy (The rationalization of nutrition)
Přírodní vědy ve škole, 30, 1978/79, No. 9, pp. 329-331.
3 tabs.

During the last 20 years in Czechoslovakia 80 % of the assortment of food eaten has changed. The consumption of delicacies has increased, as well as that of low calory foods and the assortment of food for specific age categories, such as baby food, food for young children, dietary foods, small packages for single people, etc. Also the production of frozen food has substantially increased, as well as that of ready-made food and fast foods. Also food made of new protein sources has increased, as well as food with better nutritional qualities.

On a world-wide scale there is also a clear trend towards changes in the basic types of food eaten.

The consumption of grains has decreased, the consumption of sugar has ceased to increase and remains stable in the vicinity of 50 kg per capita annually. It is estimated that eggs are consumed at the rate of 18 kg per capita annually. The consumption of milk has a declining trend, even if there are large differences between various countries.

VČ

YURKOVSKAYA, V. Z.
O polozhenii cheloveka v otryade primatov (The position of man in the order of primates)
Biologiya v shkole, 53, 1979, No. 3, pp. 7-11.

In 1735 K. Linné in his "Systema naturae" for the first time included man among the primates and gave him the name Homo sapiens. This was made possible by the geographical discoveries of the 16th and 17th centuries, in the course of which primates were discovered. At that time Linné was attacked by the German anatomist and physiologist Blumenbach, who divided primates in those with two hands (man) and those with four hands, thus separating man from the other primates. A new impuls for the study of this problem appeared in the XIXth century by the discovery of the relics of prehistoric man in Europe and by the publication of Darwin´s On the Origin of the Species. In 1863 R. Huxley´s book Man´s Place in Nature was published, where Huxley proved that primates are closer to man than to the lower primates. These findings were confirmed by Darwin in his book The Decent of Man, and Selection in Relation to Sex (1871). Towards the end of the XIXth century the classification of man which is still used at present was established: order-primates, suborder - simiae, section - catarrhine, super-family-hominoidea, family - hominidae, genus - homo, specie - sapiens. The author provides a zoological characteristic of primates, including their ethology, and systematics. She characterizes the suborder lemuroidea and tarsioidea, as well as catarrhine and platyrrhine, and on the basis of bio-chemical criteria she documents the relatedness of primates (especially chimpanzee) with man; these criteria exist on the basis of a study of amino acid sequences in some proteins, methods of hybrid DNA and chromosome analysis.

FH

KRIPPA, V. Y.
Vitaminy (Vitamins)
Biologiya v shkole, 53, 1979, No. 6, pp. 13-18.

First the author provides a historical background to the problem - how sailors died of scurvy and the first attempts made to cure them. Vitamins are defined as low molecular substances important for the normal course of bio-chemical and physiological processes taking place in an organism. Their source is especially in plants. The requirement of vitamins is closely connected with the intensity of the metabolism. If vitamin requirements are not met, either hypovitaminosis, avitaminosis or hypervitaminosis occur. At present approximately 30 vitamins are known, which can be divided into those soluble in fat (A,D,E,K,F) and those soluble in water (C, the group of B vitamins). Individual vitamins are described, as well as their discoverers, main source, function and typical symptoms of hypovitaminosis.

FH

MÜLLER, K. - KAFKA, J.
Výživa člověka v budoucnosti (Man´s nutrition in the future)
Přírodní vědy ve škole, 30, 1978-79, No. 2, pp. 47-49.
1 tab.

The food available to the world´s population is still insufficient, one third of mankind suffers from hunger. For this reason research in the area of nutrition aims at preparing new technologies for the production of non-conventional foods, which will be cheaper, of better quality and will be made of inferior or even waste materials. So-called structuralized or texturized foods are becoming more important; they are mostly produced from oil-bearing proteins and are analogs of meat. The raw material most frequently used for this purpose is soya bean. Another important nutritional component of food is milk. Imitation milk can be made partially out of skimmed milk and partially from whey. The outcome is a high protein substance there the fat component is added from oil-bearing soya beans, from peanuts and cotton seeds. Casein for enriching the imitation milk comes from grass weeds and ferns. Also algae are still waiting for their industrial utilization, because algae cultivated on the area of a meadow which is needed to feed one cow can produce as much protein as is found in the meat of 60 cows. Throughout the world research is also concentrating of the production of proteins from crude oil. Microorganisms which process the crude oil are cultivated in fermentation tanks with additives of mineral salts, oxygen and ammonia. The product of this process is not food, but a yeast cream which is then concentrated and dried. For the future it is important to make biologically valuable and nutritious substances into tasteful and hygienically acceptable food.

VČ

RENO, J.
"37°C - temperatura razuma" ("37°C - the temperature of reason")
Biologiya v shkole, 53, 1979, No. 3, pp. 20-22.

The article is a translation from French into Russian and was originally published in a French popular journal. It concerns the thermo-regulation of humans and animals. The author first explains the principle of thermoregulation. He considers the development of the thermoregulatory mechanism to be the main factor, which made life on dry land possible. Heat is the product of metabolism. Warm skin radiates warmth, while cool skin maintains heat within the body. Evaporation is a very important process which causes a decline in temperature. However, the organism also "knows" how to increase or decrease the production of heat. This process takes place in the simplest form in the work of muscles (for instance in "goose pimples" in people, chattering of teeth and increasing muscle tone connected with turgor).

FH

ROZEN, V. B. - MATARADZE, G. D.
Gumoralnaya regulatsiya protsesov zhiznedeyatelnosti
(The humoral regulation of life processes)
Biologiya v shkole, 53, 1979, No. 2, pp. 18-26, 2 figs.

The organism of an animal or man has approximately 100 trillion cells with various structures and functions. The unity and integrity of the functioning and reactions of the organism are provided by the nerve and humoral system. The humoral system regulates the activity of organs by chemical signals through circulating fluids in the body. The most important form of humoral regulation is hormonal regulation, implemented through hormones, which influence the morphology and physiology of cells. All hormones have the following characteristics: 1. they are specific, 2. they are highly biologically active, 3. they are produced by excretion into the blood, 4. they influence distant body structures. The authors go on to describe the function of endocrine glands (the thyroid gland, parathyroid glands, adrenal glands, gonads, the pancreas, thymus, epiphysis, pituitary gland). Special attention is devoted to the pituitary gland, whose activity is connected with that of the hypothalamus, and which produces several hormones. Its function is to stimulate (liberines), as well as to inhibit (statins). The authors also describe bio-synthesis and hormone secretion, the regulation and auto-regulation of these processes, the transportation of hormones by the blood stream and the effect of hormones on tissues and their metabolism.

FH

15.4 General biology

BAYEV, A.

Geneticheskaya inzheneriya (Genetic engineering)
Biologiya v shkole, 53, 1979, No. 3, pp. 17-19.

The brief history of molecular biology has been characterized by a number of successes. Surprising developments have occured especially in the study of heredity. Genetic engineering is a promising field;

its aim is the artificial forming of functioning genes. Such a gene can then be introduced into a cell, thus changing its basic characteristics. For instance in micro-organisms it is possible in this way to greatly increase their productivity. Another possibility is the introduction of genes which will lead to higher nitrogen fixation. The traits of an embryo can be changed by transfering an alien nucelus into an egg cell. In medicine it can help in the diagnosis of genetic metabolic disorders and in producing specific hormones.

FH

ČÍŽKOVÁ V.

Vzájemné vztahy mezi organismy v přírodě (Mutual relations among organisms in nature)
Přírodní vědy ve škole, 30, 1978/79, No. 6, pp. 202-203.
1 tab.

The article acquaints the reader with a new approach to the classification of organisms. This classification is based on the impact of three basic trends - a positive, a negative and zero. If relations are mutually negative, then we are dealing with competition. Individual species may compete as far as food, territory or other common needs are concerned. If co-existence is one-sidedly positive, but does not cause any damage to the other side, then we use the term commensal species. Positive trends in mutual co-existence are for instance providing hiding areas, protection, the easier acquisition of food, without at the same time in any way damaging the other organisms. The relation between two organisms, where co-existence is positive for both sides, but is not absolutely necessary for either one of them, is called cooperation. For instance various specie of anemones live in this cooperation with the hermit crab. When the mutual relation between two organisms is positive and at the same time vitally necessary for both of them, then we are dealing with mutualism. As an example of mutualism the author mentions lichens. When one organism has a negative influence on the growth of another oganism by the products it excretes, this is called amensalism. Thus far it is known only among plants. The relation between a wildly living organism and the organism which it attacks, immediately kills and consumes, is called predation. If one organism uses another organism as a source of its food or as its environment, by which it directly or indirectly damages the other organism, this is called parasitism.

VČ

DOSTÁL, P.

Současné poznatky o původu života na Zemi (Contemporary knowledge concerning the origin of life on Earth)

Přírodní vědy ve škole, 30, 1978/79, No. 5, pp.162-164.

1 diagram.

The article sums up information on historical and contemporary opinions concerning the origins of life. The author provides a brief description of various hypotheses and examples of their advocates. Contemporary theories are dealt with in greater detail; their common trait is the assumption that life developed on the basis of gradual changes from nonliving into living matter here on Earth. For this reason these theories are sometimes designated as autochtonic abiogenesis (in contrast to a naïve materialistic spontanneous abiogenesis). In spite of the fact that different scientists may not have identical opinions concerning some stage of the development of life, they all seek answers to three basic questions: 1. When did life originate on Earth ? 2. Where did life originate on Earth - in what type of environment. 3. Under what conditions did it develop - which external factors made their impact in the forming of first living systems. The article provides information on the opinions of the foremost experts in this field throughout the world, such as Oparin, Fox, Miller, Moser, Liebel and others, who are attempting to find and prove the answers to these questions.

VČ

HAGENMAIER, H. E.

Zur Wirkungsweise Wasserstoff - übertragender Enzyme im Zellstoffwechsel (On the method by which hydrogen is effective in the transmission of enzymes in cell metabolism)

Der mathematische und naturwissenschaftliche Unterricht, 32, 1979, No. 1, pp. 45-48. 4 figs.

A living cell can make use of energy only if it is gradually made available and a suitable form of its storage is possible. A cell acquires energy through its mitochondria by sequences of reactions which are mutually and functionally tied to each other and which participate in reactions whose aim it is to free hydrogen, in reactions for the oxydation of hydrogen and in reactions aimed at attracting energy. The article deals in detail with those reactions which aim at freeing hydrogen and which can be very well shown in class with the use of Thunberger reactive vessels as a special teaching medium.

AA

JURA, C.
Potrzeby rozwijającego się zarodka (The requirements of a developing embryo)
Biologia w szkole, 32, 1979, No. 1, pp. 13-16. 1 fig.

In each stage of its development an animal embryo is a living organism, which requires specific substances if all its life processes are to take place. Embryos do not have special organs for obtaining food. Reserve substances for their development are found in the egg yoke, which is a source of energy and building materials. Embryos which develop in eggs in marine water have very little egg yoke, which is made up exclusively of proteins and sugars. Embryos which develop from eggs on dry land are rich in reserve substances, mainly fats. Eggs which develop in cooler climates have more egg yoke, which is richer in fats. An embryo also needs water, oxygen and mineral substance. Often embryos will take water from their environment - for instance the embryo of a shark acquires four time the quantity of water than is the weight of the fertilized egg. Water is acquired by diffusion. For building their bones, embryos accept ions of various elements from the environment, especially those of Na and K. Some stages in the development of an embryo are especially sensitive to changes in the environment, for instance during the forming of the gastrula. Among land living animals the problem of sufficient quantities of water was solved in the process of evolution. The eggs of some terrestrial amphibians are layed into water. In other terrestrial animals protective layers were formed around the embryo to prevent evaporation. Such an egg forms a closed system. Some insect eggs have a special arrangement that has developed for accepting food from the environment, for instance the egg of the stinkbug

Trialeurodes vaporarium. The author also discusses the problem of viviparity, ovoviviparity and oviparity. For oviparous animals (vertebrates) the temperature of the environment for the development of the egg is very important.

AA

KATTMANN, U.

Hat die Evolution ein Ziel ? Den Zwiespalt von Zufall und Plan überwinden /Does evolution have an aim ? On overcoming the contradiction between chance and a plan)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 3, pp. 66-69.

The biological theory of evolution since its beginnings is in contradiction with religion and idealistic outlooks. First the problem was man´s place in the development of organisms (H. Huxley: Evidence as to Man's Place in Nature, 1863; C. Darwin: The Decent of Man, 1871; Ernst Haeckel: Anthropogenie). At present the problem is evolution as such and there are still attempts to combine gensis with religious outlooks (Teihard de Chardin). Two books are of interest in this context, one written by Carsten Bresch in 1977 called "Zwischenstufe Leben" and the other by biologists Gerd and Heidi von Wahlert called "Was Darwin noch nicht wissen konnte", also published in 1977. Both books aim at overcoming the contradiction posed by the problem of plan or random process. The authors describe evolution from various points of view and come to various conclusions. C. Bresch describes evolution as a necessary and integrated process which develops forcibly on the basis of the qualities of matter. Lesser structural components are combined on the basis of their characteristics into larger units which achieve different qualities than those of their structural components. The new larger units can, in the course of further integration, be combined anew. Bresch distinguishes a materialistic, biological and intellectual level of evolution. In his opinion at present biological evolution is in its final stages and intellectual evolution is taking over, which from the existing structural components will build new units controlled and mastered by human intelligence.

AA

KATMANN, U.

Wohin führt uns die Genforschung ? (Where is the study of genes leading us ?)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 11, pp. 281-287.

Recently sceptical outlooks have become fashionable, as far as the opportunities provided by biological techniques and especially genetic engineering are concerned. Brain surgery and test tube babies are sometimes also cited in this context. The author here discusses genetic studies, especially the forming of new genetic possibilities in individual organisms on the basis of artificially transfered genetic information in a cell. Classical genetic manipulation includes three stages of cultivating or breeding techniques: selection without a precise knowledge of the laws of genetics, combination breeding and direct intervention into the hereditary basis of the plant or animal for cultivation, on the basis of a knowledge of the laws of genetics.

This latter includes the multiplication of the number of chromosomes, grafting fragments of chromosomes, etc. The author describes how it is possible today to artificially intervene into the genetic fund of an organism (of viruses or bacteria) as well as the present state of our abilities to manipulate genes. He also discusses general problems of molecular genetics and the opinions of those who warn against the present trend in research in the genetics of micro-organisms, as well as the possibility of politically misusing the findings of research in genetics.

AA

KISELEV, L. - KUKHANOVA, M. K.
Biosintez belkov (The bio-synthesis of protein)
Biologiya v shkole, 53, 1979, No. 5, pp. 15-29.
3 figs.

A study of bio-synthesis of proteins began in the forties of this century. The authors divide this process into four stages. In the first stage information from DNA is transcribed into m-RNA, whose structure and characteristics the authors describe. In the next stage amino-acids are activated and they are bonded to t-RNA with the participation of activating enzymes. In the last stage amino-acids are recombined on ribosomes. Ribosomes are composed of molecules of o-RNA and proteins. The authors go on to specify the structure of ribosomes in the prokaryonts and eukaryonts of cells. The process proper of combining amino-acids includes iniciation (AUG triplets), elongation (with the participation of a special factor and GTP) and termination (UAA, CGA, UAG triplets). In conclusion the authors discuss the structure and function of polysomes.

FH

MONIN, A. - MONIN, H.

Ebauche d'un modèle pour l'étude de la méiose

(The outline of a model for the study of meiosis)

Biologie, Géologie, 66, 1979, No. 1, pp. 83-91.
7 figs.

In contrast to the predominating opinion that meiosis is an exceptional phenomenon, the author is of the opinion that regularly occuring meiosis is the basic process of sexual reproduction and the evolution of species. His study is supplemented with micro-photographs and drawings.

LR

OBRÉ, A.

Constantes biologiques et unités internationales S. I.

(Biological constants and international S. I. standards)

Biologie, Géologie, 66, 1979, No. 4, pp. 799-800.

Since January 1st, 1979 all findings of biological analysis should be expressed in "moles" (on the basis of a decision of the 14th General Assembly on Weightes and Measures, CIPM, in 1969) or in fractions of mols (milimols, micromols, nanomols) per 1 liter, i.e. in concentrations of active substance, in place of the concentration per unit of weight (g/l). The author describes a method of calculating previously used units into moles and provides a concrete example of a blood analysis done in the old and new units.

LR

PETZOLD, R.
Biologische Membranen (II) (Biological membranes - II.)
Biologie in der Schule, 28, 1979, No. 2-3, pp. 107-114.

The author first describes the electrical potential found on membranes and the flow of ions through a membrane. Inside, a cell has a negative charge. On the basis of the approach to a cell as an open system, the author explains disequilibrium, dynamic equilibrium and thermo-dynamic equilibrium. Special attention is devoted to states of equilibrium in living cells and the development of potential on a membrane (at rest and in action). Potentials are expressed on the basis of a Goedman equiation. The resulting potential of the cell is the outcome of Dounan's potential and the diffusion potential; its value is approximately 100 mV.

FH

SUTT, J. T.
Steuerung der Evolution - Probleme und Scheinprobleme
(Control of evolution - problems and would-be problems)
Biologie in der Schule, 28, 1979, No. 4, pp. 166-168.

In spite of the deep understanding which has been achieved of the essence of the interaction between society and nature, evolutionary theoretical aspects are not taken sufficiently into account. This is apparent above all in the fact that living nature is understood as a static object. On the other hand synthetic evolutionary theory has shown that the bio-sphere reacts to anthropogenic pressures by active micro-evolutionary changes in the population of various organisms. Anthropogenic influences upon nature are the cause of destabilization (and in individual cases even the destruction) of bio-cenoses, which from an evolutionary point of view, represent for the integrity of the bio-sphere a greater danger than the mere destruction of a single plant or animal species. For overcoming the contradiction in the interaction between society and nature the transition to a controlled evolution of the bio-sphere by man is sometimes considered to be a universal solution. But such solution represents certain difficulties, which follow, among others from the super-complexity of the bio-sphere and the stochastic nature of all forecasts. Some authors, moreover, understand control of evolution as the "ecologization" of human activities and as the optimalization of the interaction between society and nature, which the author documents on the basis of specific examples. The question of a controlled environment has been answered very precisely by Berman et al. (1967): The aim of controlled evolution is the forming of new organizational forms (strains, varieties, races) which have morphological and physiological qualities, which man requires and which are adapted to ecological conditions, while their useful traits are transmitted to their progeny.

FH

WEISZ, W.
Schutzfärbung der Tiere (The protective colouring of animals)
Biologie in der Schule, 28, 1979, No. 4, pp. 151-152.
8 figs.

The adaptation of animals is the outcome of evolution and its study is very interesting for pupils. The topic provides an simple and convincing demonstration of the outcome of evolutionary changes. The author also comments the photographs which are attached to the article.

PH

15.5 *Medicine*

HORNÍK, F.

Co je rakovina (What is cancer)

Přírodni vědy ve škole, 30, 1978/79, No. 10, p. 364.

Cancer cells multiply more rapidly and more frequently than normal cells, do not manifest any contact inhibition, they grow in an invasive manner and tend to metastasize, i.e. they abandon the primary tumor and through the lymphatic or blood circulation system they spread to other parts of the body, especially the lungs, liver, but also to the bones, where they form secondary tumors (metastasis) and lose the functions which are typical of tissue or bodies from which they grow; they also have other antigenic properties.

Until now it has not be precisely determined which molecular biological changes distinguish cancer cells from normal cells. What is certain is that control mechanisms which are responsible for cell division and cell differentiation have broken down and that this disorder is fixed in the genetic material of every cancer cell and is thus irreversible.

VČ

KOMINKOV, L. P.
Antibiotikorezistentni formi na Staphylococcus aureus i brobata s nakh (Forms of the bacterium Staphylococcus aureus which are resistant to antibiotics and how to fight them)
Biologiya i khimiya, 22, 1979, No. 1, pp. 6-10,
1 photo.

The article sums up the opinions of various authors written during the last 15 years, which concern the problem of the use of anti-biotics (penicillin, streptomycin, tetracycline, chloramphenicol, etc.) in various stages of the process of multiplication of the bacterium Staphylococcus aureus. A knowledge of the biology of its various forms can help to prevent the development of resistence against the cited drugs.

LR

KÓSMIEREK, J.
Molekularne mechanismy powstawania nowotworów
(The molecular mechanism of the development of neoplasms)
Biologia w szkole, 32, 1979, No. 1, pp. 4-12.
2 photos, 8 figs.

Cancer (neoplasms) is a manifestation of a breakdown of the cell division mechanism in the organism. It develops by faulty genetic information in a single cell of the body and then spreads from a primary locality to distant places in the organism. Neoplasms are the outcome of extra-cellular factors, chemicals, ion radiation or oncogenic viruses. The article describes in detail what is known about chemical carcinogens and oncogenic viruses. The relation of chemicals to cancer was first described by Pottem in

1775 (the influence of soot and the development of cancer of the scrotum in chimney sweeps). People who work with asbestos are especially supseptible to cancer, as well as tobacco smokers; cancer can also develop as a consequence of specific substance in food. The diet of Americans is the cause of the fact that cancer of the colon is more predominant than cancer of the stomach (an abundance of meat in the diet). In Japan this ratio is the opposite, but among immigrants from Japan to the USA the ratio changes already in the second generation. Aromatic carbohydrates can cause cancer of the skin. 3.4-benzpyrene made of tar and 9.10 dimethyl-1.2-benzantracene are also strong carcinogens. Chemical carcinogens are either ultimate (they do not require activation by enzymes), or procarcinogens (which require activiation by enzymes). For the study and proof of cancer causation selected bacterial cultures are used. They do not, however, contain activating enzymes. Prof. Ames in 1975 discovered the possibility of activating chemical carcinogens in the bacterium Salmonella typhi murinum by adding enzymes from rat livers which activate fractions. On the basis of this method and with the use of this bacteria, carcinogenity was proven in 157 chemicals, out of 175, i.e. 90 %. Montesano and Bartsch in 1976 proved the carcinogenic and mutagenetic properties of compounds of N-alkilo and N-nitoso, which directly cause (or their precursors) neoplasms. Also the study of oncogenic virus has made advances. The factor which causes changes in the genome of a cell is the nucleic acid of a virus. This mechanism was shown on the basis of Burkitt's disease of children, which is endemic in Uganda and is caused by the Epstein-Barr virus.

Most recently the development of neoplasms caused by the virus SV 40 (Simian virus 40 - found among capuchin monkeys) was demonstrated. Oncogenic viruses can be divided into DNA and RNA viruses. SV 40 is a DNA virus. Among the RNA viruses is the virus Rousa. In all oncogenic DNA viruses the productive stage is connected with reproduction and is separated from the stage connected with the transformation of genomes in the host cell. In RNA both stages, the productive and non-productive, can occur simultaneously. In RNS viruses an opposite transformation takes place (protein - RNA) in what is called reverse transcription: A combined characteristic of both DNA and RNA viruses is their ability to implant their genetic material into the genome of the cell.

AA

LAUMONIER, B.

La réponse immunitaire - introduction à l'immunologie général (An introduction to general immunology)
Biologie, Géologie, 66, 1979, No. 5, pp. 455-491.
10 figs.

An extensive and instructive article on immunology as a biological and a medical discipline. It analyses in detail the function of cells and blood cells and the activity of antigenes.

LR

M. P.

Program zwalczania nowotworów (A program for combating cancer)
Biologia w szkole, 32, 1979, No. 1, pp. 12-15.

Two years ago a program was adopted in Poland to combat cancer, which has aroused a great deal of interest. It is carried out at several levels. The education and schooling of highly qualified physicians is carried out, as well as more intensive scientific research. Investments are being made into oncological departments of hospitals and special hospitals are being built. The program assumes a doubling of investments into this area. By the year 1990 there will be a total of twelve regional oncological centers with 6 000 beds. In Warsaw, in the close vicinity of the Haematological Institute Building a new building is being built for a consultation center for physicians from all of Poland. A Radium Institute has been in Warsaw since 1932.

AA

PLYTYCZ, B.
Na czym polega nadzór immunologiczny organizmu
(What is the immunological ability of the organism)
Biologia w szkole, 32, 1979, No. 3, pp. 99-103.
7 figs.

The process of phagocytosis is well known. Recently, however, a number of discoveries have been made concerning immunological reactions of the defensive system of vertebrates towards antigens (viruses, bacteria, parasites, chemical substances, drugs, the pollen of plants, etc.). The immunological systems of vertebrates are characterised by a very good memory and perseverance, they are capable of distinguishing individual antigens and of remembering them after a single encounter. The components of the immunological system are so-called immunoglobulins, which are found in lymphocytes. Particles of immunoglobulin are formed by four polypeptide chains: two identical heavy chains H and two identical light chains L, according to the formula 2H-2L. The terminal parts of H and L are designated as constant sections C (thus we obtain CH, CL), whereas opposite ends are variable sections V, hence CH, VL. Their structure thus provides 10^4 to 10^5 different possibilities of combinations in a section. Immunoglobulin is formed by lymphocytes. The great variability of polypeptide chains is explained by various theories: the theory of germinal lines, the theory of somatic mutations and a theory based on a new theory of cloning, developed by Burkitt. Two main types of immunological responses are known to exist: a humoral response (where the antigens destroy free antibodies) and cellular response (where lymphocytes destroy antigens). The clonal theory serves very well to explain the memory of immunoglobulins: part of the lymphocytes which develop by clonal selection do not participate in the destruction of antigens and hence represents the memory of the organism for a specific antigene. In adult organisms immunological responses make the transmission of grafts very difficult, but in the embryonic stage such transmissions are possible. Immunological reactions, however, facilitate the growth and metastasis of neoplasms in cancer. A break down in tolerance, in relation to the body's antigenes, is the cause of auto-aggression, which is for instance the cause of rheumatism.

AA

SCHWINGER, E.
Möglichkeiten und Grenzen der pränatalen Fruchtwasserdiagnostik (The possibilities and limits of the prenatal diagnosis of the fluid surrounding the foetus)
Biologieunterricht, 15, 1979, No. 2, pp. 50-58, 2 figs.

Contemporary medicine has made great advances in diagnosing the fluid surrounding the foetus (liquor amnii) before delivery in order to diagnose congential disease, which is becoming an important part of human medicine. The method enables the prevention of delivery of damaged or degenerated babies (due to incompatibility with the Rh factor, or chromosomal abberations). The author describes in detail the use and significance of this diagnostic method and shows how pupils can be acquainted with this interesting problem.

AA

STENGEL, H.
Angeborene Fehlbildungen bei Menschen und ihre Ursachen (Congenital defects in humans and their causes)
Biologieunterricht, 15, 1979, No. 2, pp. 34-49.
4 tabs. 2 figs.

Biology is of great importance in the modern world because the increase of industrialization and the widespread use of technology pose a serious threat to the human environment. Damage caused by civilization factors can also damage the human embryo during pregnancy. Such damage can also occur due to the use of drugs. The organism of the mother is to an increasing extent exposed to damaging exogenic, as well as endogenic factors. The author provides a survey of human teartology, its history and stresses contemporary problems, such as the use of the drug Contergan in the Federal Republic of Germany and its consequences, the use of thalmomide which contains sleep inducing components, as well as teratogenetic substances, and the development of other malformations. Damage is mainly caused in ontogeny, both in the prenatal and perinatal period, and to a much lesser extent in the postnatal period in the development of man. The course of prenatal development is described in detail, including progenesis (the marutiry of the gametes), kyematogenesis (from conception until delivery) which can be divided into three stages - lastogenesis (when blastocytes develop), embryogenesis (from the nesting of the egg until the differentiation of the fetus and the development of an embryo) and fetogenesis (the development of the fetus and the further differentiation of organs). This development is terminated with labour. The author describes various types of embryonic malformations and their endogenic and exogenic causes. He points out that today 7 % of children are born with evident damage and 20-30 % of embryos die in the early stages of pregnancy. However, 45 % of all damaged children live to an age, when they are able to reproduce. He provides a survey of genetically caused human taratoids. In conclusion the article provides a survey of substances which can cause teratoids (ion radiation, short waves, noise, a decrease or increase in body temperature, sunbathing, mechanical factors, a break down in oxygen supply, infections, the mother's nutrition, hormonal disregulation in the mother, the use of drugs, alkaloids such as nicotine, pesticides, herbicides, lead compounds, radio-mimetics, anti-metabolites and perhaps also cosmetics).

AA

WRÓBLEWSKI, S.
Cytofiziologia odpowiedzi immunologicznej (The cytophysiology of immunological response)
Biologia w szkole, 32, 1979, No. 3, pp. 104-107.
1 fig.

During evolution vertebrates have developed a special immunological protective system, which destroys through the lymphocyte system antigens which have penetrated the body, as well as foreign substances. Lymphocytes in the bodies of vertebrates mature in the thymus, in the Fabricius gland (in birds), in the liver, spleen, bone marrow or in Peyer's cells. Lymphocytes which mature in the thymus are as designated as T, those which mature in the Fabricius gland (or its equivalent) as B. Both types of lymphocytes differ in characteristics, as well as functions and both are found in the peripheral lymphatic organs. T lymphocytes contribute to an immunological humoral response and B lymphocytes participate in a cellular immunological response. T lymphocytes after encountering an antigene excrete humoral substances. Alergic reactions of the organism are of a humoral type (such as asthma, hay fever, hives, anaphylactic shock). A break down in the immunological system leads to a number of diseases, for instance to autoimmunoaggression, which is the cause of rheumatism, to Hashimoto's disease and to auto-immunizing tyroiditis.

AA

15.6 Agro-engineering

Eine Pflanze die es eigentlich noch nicht gibt

(A plant which in fact does not yet exist)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 3, p. 82.

Improving plants has been carried on for centuries by countless scientists and cultivators. The outcome of their work are new varieties of plants. But further work is necessary in the struggle against hunger. The laboratory of the Society for the Study of Radiation and the Environment in Munich carries out interesting experiments with the cultivation of plants from sexual cells. It has been successful in cultivating in a test tube a new potatoe plant (Solanum). It differs from normal potatoes by the number of chromosomes it has. Normally cultivated potatoe have 48 chromosomes, while the new plant has only 12 (the original number of chromosomes is twice reduced!). This plant can form the foundation for the cultivation of a new variety of potatoe, which could be cultivated from seeds. The existing varieties of potatoes can only be cultivated from tubers, which among others have the drawback of being conductive to various plant disease. The laboratory has also been successful in cultivating barley from sexual cells with half the number of chromosomes (7). The laboratory has over 100 plants of this barley. Such procedures represent important discoveries and a great contribution, because the hereditary properties of cultivated plants could be changed in a test tube.

AA

Methoden zur Reduzierung des Einsatzes chemischer Bekämpfungsmittel im Pflanzenschutz (Methods for reducing the need to use chemicals for protecting plants)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 4, p.111.

The amount of damage done by caterpillars of the cabbage butterfly depends on the time when the eggs are layed. The larger the plants on which the female of the cabbage butterfly layes her eggs, the smaller the damage done. For this reason it is possible to decrease the use of insecticides by planting early and highly resistant varieties of vegetables, before the first generation of cabbage butterflies appears. Otherwise their number must be reduced with insecticides. In a similar vein it has been found that spraying with water can substantially decrease the damage done by the plant louse on sugar beets and on fodder beets. The plant-louse (Aphis fabae) causes damage to crops in dry years equal to 10-20 %, and in years of draught up to 80 %. By sufficiently spraying the plants with water, losses were cut to 5 %.

AA

Methoden zur Reduzierung des Einsatzes chemischer Bekämpfungsmittel im Pflanzenschutz (Methods for reducing the amount of chemicals used for protecting plants)

Praxis der Naturwissenschaft - Biologie im Unterricht der Schulen, 28, 1979, No. 8, pp. 216-217.

The article provides information on possibilities of the appearance of a disease of winter wheat which causes the breaking of stalks and is caused by the fungi Cereosporella herptrichoides, which depends on the time available in January and March for acquiring the infection, caused by spores of the fungi, which in turn depend on the temperature. In combating plant disease it is also possible to make use of the antagonistical activity of one fungus against another. Experiments. with the fungi of the Trichoderma specie, which act upon the fungus Botrytis cinerea which destroys strawberries, are very promising. On the basis of experiments carried out by Norwegian scientists, spores of Trichoderma can be added to fungicides. Japanese scientists have verifyied more than 200 various substances suitable for combating fungicidal disease. Some are even added to food. Thus for instance lecitine made of soya beans has an extraordinary antifungicidal effect. Similarly some substances are used for the protection of plants, especially of young maize and beets. During planting, the substance is mixed into the narrow strip of soil between rows of plants, so that approximately 30 % of the cultivated area is treated. This is sufficient to protect the crop against insects and nematodes.

AA

NIKITENKO, E. L.
Noviy etap v razvitii selskogo khozyastva (A new stage in the development of agriculture)
Biologiya v shkole, 53, 1979, No. 1, pp. 7-14.

The present agricultural policy of the Communist party of the Soviet Union is characterized by a complex approach to problems and the utilization of practical experiences and the conditions existing in the USSR. Since 1965 the fixed assets of collective farms and state farms have increased by 2.8 times the consumption of electrical energy has increased 4 times, the use of mineral fertilizers 3 times. Soil improvement has been carried out on 27 million hectars of land. The number of qualified personnel has increased. All this has positively influenced the increase of agricultural output and productivity of labour. The author cites a number of specific data and successes in various sectors of agriculture, which are connected with the success of Soviet science and technology.

FH

RÄUBER, R.
Entwicklung des Getreides produktionsbezogen dargestellt (The development of grain - explained on the basis of its relation to production)
Biologie in der Schule, 28, 1979, No. 2-3, pp. 55-66.
7 figs., 6 tabs.

An increase in the output of grain is connected with the introduction of new varieties and intensification, which in turn assumes chemization, mechanization, soil improvement and breeding. All this in turn requires extensive biological knowledge. The author here concentrates on the transmission of knowledge concerning the stages of development of grain. First he deals with the germination of the plant (the structure of grains, their swelling from a bio-physical and bio-chemical point of view, morphological processes which occur in germination), the development stages of grains, for instance the transition from the vegetative stage to the generative stage, germination, blooming, maturity and finally the stage of rest.

FH

Sterben die Ackerunkräuter aus ? (Will weeds die out?) Naturwissenschaften im Unterricht, 27, 1979, No. 10, p. 315.

Biologists in recent years have been pointing out that as a consequence of the use of **herbacides** some types of weeds have been disappearing from fields. Some have already become extinct and the existance of others is threatened. Thus domestic flora is becoming poorer and in place of these species new ones, which are also unwanted, are making their appearance. Of the 2 352 wild plants growing in the Federal Republic, approximately two hundred are weeds. This number is, however, declining among others also because of the very thorough cleaning of seed material before planting, and by changes in the agro-technology of grain crops.

AA

DORST, F. W.
Zur Wirkung der Streumittel bei der Kartoffel
(On the effects of sprays on potatoes)
Naturwissenschaften im Unterricht. Zeitschrift für die Unterrichtspraxis der Sekundarstufe I - Biologie, 27, 1979, No. 1, pp. 16-23.

When potatoes are stored, measures are taken to prevent their too early germination. Under normal conditions potatoes begin to germinate in storage only in April. Earlier germination is caused by improper storage facilities where the temperature is too high. The best type of storage facility is one which is lined with stone, which is kept moist by the action of the water table and in which a stable temperature of + 8 °C is maintained. When such a storage facility is not available, too early germination can be prevented by spraying the potatoes with an antigermination medium. The author recommends carrying out a simple experiment: in one basket non-treated potatoes are placed, while those in a second basket are treated with an anti-germination medium such as Tixit. Treated potatoes must, however, be very well washed before consumption and black spots on them, which are the potatoe seeds killed of by the treatment, must be cut out with a knife. Such treatment at the same time prevents the spread of mildew and putrefaction.

AA

15.7 Zoo-engineering

PRUDOV, A.
O proizvodstve produktov zhivotnovodstva na promishlennoy osnove (On producing dairy, meat and poultry products on an industrial basis)
Biologiya v shkole, 53, 1979, No. 2, pp. 12-17.

The June plenary session of the Central Committee of the Communist Party of the Soviet Union in 1978 determined large-scale tasks for agriculture. One of the most important tasks is to accelerate the growth of animal products. The author first describes what has already been achieved and the successes in this area and then deals specifically with the tasks determined by the Central Committee. Among the most characteristic traits of industrial technologies in animal production are the concentration and specialization of output, its complex mechanization and automation, the introduction of continuous technological processes, improving working conditions and higher demands made upon the qualification of personnel. The author specifies in greater detail these aspects on the basis of specific examples.

FH

TRINCHENKO, L. G,
Sovremenniye ptitsefabriki (Modern poultry plants)
Biologiya v shkole, 53, 1979, No. 6, pp. 19-21. 1 fig.

Modern poultry plants are large, highly specialized enterprises, where the staff work eight hours a day on three shifts. Some of these plants specialize in the output of meat and others in the output of eggs. All of them use industrial techniques. Leghorns, the poultry variety most often bred in these plants, produce 250 to 280 eggs annually. The author describes the organization of such a poultry farm with its incubators, the selection and inspection of eggs, maintaining optimum temperatures, etc.

FH

VENEDIKTOV, A. M.
Nauchniye osnovi racionalnogo kormleniya selskokhozyaystvennikh zhivotnikh (The scientific foundation of the rational feeding of farm animals)
Biologiya v shkole, 53, 1979, No. 3, pp. 11-17, 2 tabs.

The basic prerequisite for increasing the productivity of farm animals is their rational and good quality feeding, which provides a sufficient quantity of all needed food components, including vitamins, minerals, etc. Basic nutritious components of animal feed are proteins, saccharides and fats, as well as vitamins A, B, C, D and E. The author discusses in detail the feeding of ruminants and the amount and share of hay, straw, silage, beets and cereals which these animals should receive.

FH

15.8 Prominent scientists, anniversaries, deaths, the work of scientific institutions

BASHNAKOVA, E. G.
Zhan Batist Lamark (Jean Batiste Lamarck)
Biologiya i khimiya, 22, 1979, No. 2, pp. 52-54.
1 photo.

This great French natural scientists was born in 1744 and died in 1829. This year it is 150 years since his birth and 170 years since the publication of his most important work, Philosophie Zoologique. The author provides a brief outline of Lamarck's biography and the main contributions made by his work. According to Lamarck there are two main factors of evolution:

1. The active influence of the external environment.
2. A tendency of the organism for improvement.

Very interesting is his theory concerning changes in body organs due to their use or lack of use. Lamarck was a materialist, and was the first to explain the laws of evolution of organisms, changes which occur in nature and the progressive quality of evolution.

LR

BAUMANN, K.

Jahresbericht der Gesellschaft für Strahlen- und Umweltforschung (Annual report of the Society for Radiation and Environmental Studies)

Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 1, pp. 26-27.

In the Federal Republic several scientific societies have joined forces, so that at present this society is the only one of its kind in the country. It has 35 different institutions and independent departments; of this number 23 are found in Bavaria and 14 in Neuherberg. In 1977 these institutions had a combined budget of 142.5 million DM. The main part of biological research concerns a study of radiation and its impact on the environment, biological a medical technology and keeping a large scientific collection of micro-organisms. The tasks of the Society have been formulated anew.

AA

BRETSCHNEIDER, J.

17. Arbeitstagung des Bereiches Philosophie/Wissenschaften der Humboldt-Universität zu Berlin (The 17th session of the Philosophy-Science section of the Humboldt University in Berlin)

Biologie der Schule, 28, 1979, No. 9, pp. 392-393.

The meeting was held from March 23rd to 27th, 1979 and was organized by specialists in the philosophy of the natural sciences. H. Ley presented a paper called The Development and Relationship of Philosophy and the Natural Sciences. M. Schelhorn presented a paper on the philosophical aspects of the development of living matter and G. Tembrock on behaviour and evolution. Also other papers presented had similar themes.

FH

CIEŚLINSKI, S. - MAJECKA, Z.
Z działalności instytutu biologii WSP v Kielcach
(On the activities of the Biology Institute of the Pedagogical School in Kielce)
Biologia w szkole, 32, 1979, No. 4, pp. 156-162.
5 photos.

The Pedagogical School in Kielce, which is an institution of higher learning, has celebrated a decade of scientific, didactical and educational work. At the beginning of the school year in 1973-74 an Institute of Biology was founded in the school. Its staff includes 62 people, of which 45 are graduates of the school, seven are professors and 10 have PhDs. A number of special laboratories and workshops have come into being, including laboratories for electrone microscopy, botany, zoology, animal physiology, plant physiology and bio-chemistry. The authors discuss work in the didactics of biology for obtaining a degree, the field work of pupils, seminars, the problem of educating students for scientific work and the participation of students in various competitions. Graduates of the school also work in adult education, are among the organizers of Biology Olympiads, have become biology supervisors in general education secondary schools, as well as in other types of schools. In conclusion the author cites some of the subjects of scientific work done at the school.

AA

FERENS,B.

Bohater bezkrwawych łowów (A champion of bloodless hunting)

Biologia w szkole, 32, 1979, No. 3, pp. 137-138.

On January 19th 1979 Wlodziemierz Puchalski, the cameraman and world renowed author of films on biological topics, suddenly died in the Antarctic, just before his 70th birthday and before the 55th anniversary of his work in films. He achieved an international reputation in 1947 with the film Bird Islands. He obtained numerous prizes and awards for his films. Pucholski was also very successful in biological photography. He was the cameraman of the Polish Artic expedition to the Spitsbergen Islands.

AA

HEINRICH, W.

Schleiden zu Fragen der Okologie (M. J. Schleiden on ecological problems)

Biologie in der Schule, 28, 1979, No. 4, pp. 147-155.

The article is devoted to the 150th anniversary of the birth of M. J. Schleiden (1804-1881), one of the creators of cellular theory. In the period 1840-1862 he was a professor and the director of the Botanical Garden in Jena. In the preface to his book "Plants and their Life" he arguments against a number of obsolete theories in botany, and does not examine a plant in a static manner but in its development. The article assesses the contribution made by M. J. Schleiden to the development of phyto-geography, plant evolution and ecology. His point of departure at first was only the organismal level, but later he became interested in the relation between plants and the environment and also the influence of man on plants. He stressed the need to conserve nature. He especially stressed the importance of the forests for the landscape and also from an aesthetical point of view.

PH

JIRKOVSKÝ, R.
70 let přírodovědecké společnosti v Ostravě (70 years of the Society for Nature Studies in Ostrava)
Přírodní vědy ve škole, 30, 1978/79, No. 6, p. 210.

On January 29th, 1908 the Society for Nature Studies was founded by professor Jan Kranich from the Teacher Training Institute in Silezian Ostrava; the purpose of the Society was the dissemination of knowledge concerning the natural sciences and studying nature in the region. During the 70 years since its foundation, the Society has greatly extended the scope of its activities. At present it has six sections: for ornithology, mineralogy, botany, mycology, entomology, and a section for orchids.

VČ

KIELAN-ZAWOROWSKA, U.
O pracech zakladu paleobiologii polskiej akademii nauk (On the work of the Paleontology Institute of the Polish Academy of Sciences).
Biologia w szkole, 32, 1979, No. 3, pp. 133-135.
2 photos.

The staff of the Paleontological Institute of the Polish Academy of Sciences during the 27 years of its existence have published over 1000 scientific papers devoted to marine invertebrates from the Paleozoic, Mesozoic and Tertiary eras, from Poland and other European countries, to vertebrates from Poland, Devon fish, Tertiary and Quartenary mammals, Cretaceous and Tertairy vertebrates from Mongolia, the fauna of marine invertebrates from the Spitsbergen Islands and from some areas of the Antarctic. The article describes methods used for gathering data on paleontological specimens and their transportation and mounting in the museum. The method of monoliths, which is best suited for preserving osteological remnants of fossile vertebrates, their mounting is wooden frames and casting in plaster of Paris are described. In the laboratory, mechanical and chemical methods are used for preserving osteological material. The aim of the work is to make our knowledge of evolution of living organisms as precise as possible.

AA

KOCHMAŃSKI, B.

Inicjatywa utworzenia muzeum dydaktiki biologii

(The iniciative for organizing a museum on the didactics of biology)

Biologia w szkole, 32, 1979, No. 2, pp. 86-87.

At the 3rd All-Polish seminar on the didactics of biology, the suggestion was made to organize a museum devoted to the didactics of biology. On the basis of this iniciative a group of specialists in the history of the didactics of biology met - among them were W. Stawiński, M. Piotrowicz, Płachta and B. Kochmański. The first museum on the didactics of biology was in Stuttgart. At present there are 65 such museums in Europe. The author provides information on how various items are being procured for the museum.

AA

KORPERSCHLÄGER, G.

Bericht über den 12. europäischen Kongress für Biochemie in Dresden (Report on the 12th European Congress of Bio-Chemistry in Dresden)

Biologie in der Schule, 28, 1979, No. 1, pp.36-39.

The Congress was held from July 2nd to 8th, 1978; 3 500 participants from all the countries of Europe, from the USA, Canada, Japan and from many countries in Asia participated. The author stresses the importance of the Congress, describes its scientific program and its outcome, as well as the main papers presented to the Congress.

FH

KRAUSHAAR, R.

Molekular- und Zellbiologen aus 20 Ländern berieten in Weimar (Molecular and cellular biologists from 20 countries met in Weimar)

Biologie in der Schule, 28, 1979, No. 9, p. 393.

On July 2nd to 6th, 1979 the 6th Nuclear Workshop of the European Cellular Biology Organization (ECBO) met in Weimar. 110 scientists from 18 European countries, the USA and Japan participated. A total of 30 papers concerning 8 groups of topics and 48 discussion papers were presented, which concerned among others such subjects as the structure and dynamics of the nucelus, its morphology, ribosome genes, chromatine, the structure and expression of genes, etc.

FH

LAUTERBACH, R. - MARQUARDT, B.
Sachunterricht als Arbeitsgebiet des IPN (Factual education as a specialization taught at the IPN)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 9, pp. 248-249.

The Institute for Pedagogical Sciences has since 1976 also worked in the didactics of factual education (which since 1976 is a new teaching subject which has replaced civics). The development of factual education as a teaching subject still continues and the syllabus requires further changes. Also various material and aids for teachers schould be prepared, as well as the training of teachers for this teaching subject. The Institute has carried out an analysis of the syllabus, and has draw up a bibliography of concerning the subject. Experience is being gathered and there already exist attempts to change the concept, for instance in Schlewig-Holstein. The development of the syllabus for the teaching subject factual education begins with the topic "Animals are Different" which requires observations of animal behaviour. Teaching models for factual education are being developed also for basic schools. An other task of the Institute is the preparation of a seminar on the curriculum of Egyptian schools which is being prepared on the basis of the iniciative of the Egyptian Ministry of Education.

AA

LEPS, G.
Friedrich Engels, die Arbeitsklasse und die Ökologie
(Friedrich Engels, the working class and ecology)
Biologie in der Schule, 28, 1979, No. 4, pp. 160-166.

Every natural science forms a specific image of the world. For this reason we speak of a biological

or physical image of the world. Philosophical materialism interprets and generalizes such specific views of the world. Also the image of the world provided by ecology is of significance to man only if it is correctly interpreted in the spirit of philosophical materialism. If we apply Engels´ principle of the unity of the world, there are two philosophical principles which are important for answering ecological problems: the principle of the unity of living and non-living nature and the principle of the exchange of matter (metabolism) between living and non-living nature. With the appearance of the working class into the history of minkind, a new aspect has been added to ecological thinking - the ecological situation of the working class. K. Marx and B. Engels where the first to combine a solution to the ecological problems of the industrial revolution of the 18th and 19th centuries, with a solution to social contradictions and thus with the aims of the scientific Communism they themselves had founded. Especially the following works of F. Enfels are important from the point of view of ecology:
The Situation of the Working Class in England (1844/45),
The Housing Question (1872/73),
Anti-Duehring (1878).
The Author deals in detail with ecological problems contained in these works.

FH

MIKOŁAJCZYK, E.
Instytut biologii doświadczalnej PAN (The Institute of Experimental Biology of the Polish Academy of Sciences)
Biologia w szkole, 12, 1979, No. 5, pp. 226-228.
4 photos.

The Institute became an independent scientific research center in 1919. It was devoted at that time to three areas of study: neurobiology, physiology and general biology. The first director of the institute was prof. K. Białaswewicz. In the period 1922-26 the Institute of Experimental Embryology and the Institute of Experimental Morphology were founded, in 1935 the Institute of Neurobiology. Besides this in 1920 a hydrobiological station was founded, in 1932 a marine research station on the island of Hel and in 1937 a river research station in Polesye. During the war the Institute was destroyed. It was rebuilt in 1948 and in 1952 is passed under the jurisdiction of the Polish Ministry of Education and the Polish Academy of Sciences. In 1953 the Institute for Experimental Hydrobiology was founded, in 1974 the Ecological Institute and in 1951 the Hydrobiological station in Mikołajsk. Today the Institute is concerned with physiology and bio-chemistry on the usual level. In 1971 the Institute of Bio-chemistry was divided into the Institute for the Biochemistry of the Cell and the Institute of Biochemistry of the Nervous System and Muscle System. The author describes the work, findings, journals, symposia and conferences which all form the Institute´s activities. The Institute is well known abroad.

AA

NIKOLOV, G. K.

Ivan Mikhaylov Sechenov (1829-1905). 150 godini ot rozhdeni jeto mu (Ivan Mikhaylov Sechenov (1829-1905) - at the occasion of the 150th anniversary of his birth).

Biologiya i khimiya, 22, 1979, No.5, pp.55-57. 1 fig.

I,M. Sechenov is one of the great figures of Russian science, He was born on August 1st 1829 and was educated at the Military Engineering Academy in St. Petersburg. As a young officer he became interested in philosophy and the natural sciences. In 1850 he began to study at the medical faculty of Moscow University, where he recieved a degree in 1860. He was a follower of Hercen, Belinskiy, Chernishevskiy and Pisarev. In his scientific work he devoted his energies mainly to problems connected with the activity of the nervous system, bio-electrical phenomena and the physiology of the sensory organs.

LR

RUX, D.
Hippokrates von Kos (Hippocrates of Chios)
Biologie in der Schule, **28**, 1979, No. 11, pp. 481-483.
2 figs.

The oldest known source of ancient Greek medicine is the Iliad by Homer, which cites drinks for acquiring strength and describes simple surgical procedures. Since the 6th century B. C. Aesculapius was considered to be the God of medicine. The most important medical schools in ancient Greece were on the island of Chios and in Cnidus. The school at Cnidus stressed the symptoms of a disease and attempted to produce a systematic classification of disease, but later tended to simplify. The school at Chios placed greatest stress on the patient as an individual and expounded the principle that the causes of illness can be clarifies. The best known physician of this school was Hippocrates (460 - 370 B.C.), who is the co-author of "Corpus Hippocraticum". The author describes some parts included in this work and also mentions other physicians from ancient Greece, such as Alcmaeon of Crotona, Empedocles, Anaximenes and Diogenes.

FH

SKAUMAL, U.

Ein neuer Arbeitsbereich des Institutes für die Pädagogik der Naturwissenschaften (IPN) (A new field of activity of the Institute for the Pedagogy of the Natural Sciences - IPN)

Naturwissenschaften im Unterricht - Biologie, 27, 1979, No. 10, p. 316.

The Institute for the Pedagogics of the Natural Sciences at the University of Kiel has published a workbook called IDK (information, documentation and cooperation). It provides information on the didactics of the natural sciences, their teaching in all types of schools and provides documentation on problems concerning the supervision, systemisation and analysis of all natural science teaching subjects, their syllabi and curricula, textbooks, teaching media, etc. The Aulis-Verlag Deubnech publishing firm publishes a number of handbooks in the didactics of all natural science teaching subjects.

AA

SUCKER, U.

Kalendarium zur Biologiegeschichte 1979 (A calendar of the history of biology for 1979)

Biologie in der Schule, 28, 1979, No. 1, pp. 27-36.

The article cites important dates and anniversaries which can be used in biology teaching. 1850 years ago Galen was born, 800 years ago H. von Bingen died. Other data is cited on a monthly basis. In January - the 250th anniversary of the birth of Spallanzani; in February - the 150th anniversary of the birth of A. Brelim, the 175th anniversary of the death of Kant, the 425th anniversary of the death of H. Bock, the 50th anniversary of the death of von Pirgnet; in March - the

125th anniversary of the birth of Ehrlick and von Behring; in April - the 175th anniversary of the birth of Schleiden; in May - the 75th anniversary of the death of W. His; in June - the 125th anniversary of the birth of M. Rubner, the 150th anniversary of the birth of W. Pflüger; in July - 175th anniversary of the birth of R. Oven; in August - the 200th anniversary of the virth of L. Oken, the 150th anniversary of the birth of Sechenov, the 1900th anniversary of the death of Pliny, the 40th anniversary of the death of W. Bölsche; in September - the 200th anniversary of the birth of Treviranov; in October - the 90th anniversary of the birth of P. Hertnig; in November - the 125th anniversary of the birth of G. Haberlandt, in December - the 300th anniversary of the death of Borelli, the 150th anniversary of the death of J. B. Lamarck. Also the anniversaries of important biological discoveries from 200 to 70 years ago are cited. The article is supplemented by a bibliography.

FH

VORONTSOV, N. N. - YARLOKOV, A. V.
K yubileyu Yuriye Ivanovicha Polyanskogo (At the occasion of prof. Y. I. Polyanski´s birthday)
Biologiya v shkole, 53, 1979, No. 2, pp. 30-32, 1 fig.

Prof. Y. I. Polyanskiy, doctor of biological sciences, who was born on March 15th, 1904, is celebrating his 75th birthday. His specializations include the zoology of inchordata, cytology, genetics, evolution theory, physiology and the history of science. In 1924 he graduated from the University of Leningrad, where studies zoology and did post-graduate work with prof. Dogel. After recieving his degree he taught at the same university, where he subsequently became chief of the department of zoology. In the period 1940-1941 he was chief of the department of genetics and experimental zoology. One of his first important discoveries concerned ciliatea, the parasites of flatworms and molluscs. In 1929, together with Petrushevski, he proved the diffusion properties of the nucleus in blue-green algae. He also studied the copulation of ciliatae. Already in 1935 he wrote the book "Biological Experiments in Secondary School" and also various handbooks for pedagogical schools. He was an active participant in the Great Patriotic War. After the was he published the books "General Protozoology", "A Course on General Parasitology" and "A History of Evolution Theory". He re-wrote Dogel's "The Zoology of Invertebrates". Since 1966 he is the editor-in-chief and chairman of the editorial board of the journal "Biologiya v shkole". Under his leadership a new textbook for general biology has been written for the 8th and 9th classes.

FH

ZICHÁČEK, V.

RNDr. František J. Turček - in memoriam (In memory of Dr.F.J. Turček)

Přírodní vědy ve škole, 1978/79, Nó. 1, pp. 12-13.
1 photo.

Shortly after his 60th birthday, our foremost ecologist, Dr. F. Turček died. He worked for many years in the Research Institute for Forestry and since 1964 until his death he was the chief of the Research Station of the Institute for Experimental Biology and Ecology of the Slovak Academy of Sciences in Báňská Štiavnica. The focus of his scientific work was forestry zoology, especially ornithology and mammalogy, applied to the needs of practical forestry. He studied especially topical and trophic relations between animals and trees, carried out analyses of their population and economic significance and designed various conservation measures. He is the author of a number of popular books and more than 400 professional publications.

VČ

16. Articles with information on geology, mineralogy and petrography

MENANT, G.
Aperçu géologique de la Martinique (A geological outline of the island of Martinique)
Biologie, Géologie, 66, 1979, No. 4, pp. 787-790. 1 fig.

The Lesser Antillies archipelago, to which the island of Martinique belongs, forms a characteristic arc of islands. Also on Martinique it is possible to distinguish three arcs: the old arc (composed of reefs, limestone and tuff), the middle arc (underwater lava fields) and the new arc (volcanic plio - Quartenary formations). Martinique is also rich in thermal minerals. A simple, very clear map supplements this very informative article.

LR

PFEIL, H.
Über die Bedeutung des Grundwassers (On the importance of underground water)
Naturwissenschaften im Unterricht, 27, 1979, No. 11, p. 332.

The author explains the importance of underground water as a source of drinking water. The water table tends to fluctuate and depends on the quantity of precipitation, on land reclamation projects and drainage. In the vicinity of Colonge on the Rhine during 16 years (1950-1966) the water table has declined by 8 meters ! The author describes some experiments which demonstrate the importance of underground water, such as submerging a wool fibre into water, placing a flower into water coloured with eosin and an experiment in watering a potted cyclamen three days from above and three days from below.

AA

VOLTAIRE, M.
Apercu géologique de la Guadeloupe (A geological outline of Guadeloupe)
Biologie, Géologie, 66, 1979, No. 4, pp. 781-786. 4 figs.

A brief description of the interesting geological formations found on the island of Guadeloupe in the Carribean sea, as well as the islands of Marie-Galante, La Desirode and the Les Saintes archipelago. Large geological and morphological formations are drawn on simple and very clear maps. The geological whole of the island is described on the basis cardinal points from a tectonic point of view.

LR

Wie schnell dringt Regen durch den Boden ? (How quickly does rain penetrate the soil ?)
Praxis der Naturwissenschaften - Biologie im Unterricht der Schulen, 28, 1979, No. 3, pp. 81-82.

Formerly it was believed that rain very quickly penetrates the soil. According to information published in Umschau in Wissenschaft und Technik, No. 8, 1975, the latest findings indicate that rain and rain water is forced back by water already existing deep in the soil and that it takes a number of years before water from precipitation reaches the water table. Experiments have been carried out with marked water (with tricium). Now the rate of penetration of rain water to a depth of about one meter is cited as 1 year; previously the opinion predominated that water reaches such depths already within a day.

AA

The Didactics of Biology. A selected bibliography for 1979

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